THE CERAMIC SEQUENCE FOR SOUTHWESTERN NOVA SCOTIA: A REFINEMENT OF THE PETERSEN/SANGER MODEL

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THE CERAMIC SEQUENCE FOR SOUTHWESTERN NOVA SCOTIA: A REFINEMENT OF THE PETERSEN/SANGER MODEL.

BY

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ABSTRACT

Archaeologists have long used ceramics in establishing cultural chronologies. James Petersen and David Sanger recently proposed a seven part chronological sequence, derived from prehistoric ceramic material, which may ultimately replace the traditional tripartite Ceramic Period characteristic of the Maine-Maritimes Region of the Eastern Woodlands. This thesis presents the results of a detailed stylistic and morphological analysis of ceramic material from eleven prehistoric sites in southwestern Nova Scotia which was undertaken in order to evaluate the applicability of Petersen and Sanger's model to that portion of the Maine-Maritimes region.

The ceramic collection central to this research was from the Eel Weir site, Kejimkujik National Park, which has produced the largest in situ assemblage available for analysis. Attribute information recovered from each vessel from this and other sites in southwestern Nova Scotia recovered from each vessel was entered into a file structure specifically designed for this project using the dBase III Plus computer program. In addition to the personal examination of over 20,000 sherds, a literature search produced further information relevant to the study. Comparison of the accumulated data with Petersen and Sanger's proposed chronological sequence indicates that the model is applicable to southwestern Nova Scotia and possibly to ceramics from sites external to the study region. Access to curated collections with documented provenience, as well as the continuation of controlled excavations of Ceramic Period sites, are imperative for further evaluation and refinement of the model.

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I am grateful to Dr. David Keenlyside who, among other things, interrupted his own schedule to arrange for my accommodation and daily transportation to the Asticou Center as well as taking the time to discuss this project and offer much appreciated advice. Chief among those who cheerfully helped me in Hull were Ms. Louise Renaud and Mr. Bob Pammett, who were generous in providing access to the relevant collections, and eventually loaning me the materials I required.

Without the Eel Weir ceramic assemblage this project would not have been attempted. Special thanks to Mr. Rob Ferguson of Environment Canada, Parks, Halifax, for agreeing to loan me the Eel Weir ceramics.

The private ceramic collections of three individuals were graciously

loaned to me and my supervisor for inclusion in this project. Mr. Ellis Gertridge, Mrs. Marge Hirtle and Mr. Jim Legge willingly gave up their collections temporarily for analysis and documentation, and were extremely helpful in informing us as to where the ceramics had been recovered.

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CHAPTER 1

INTRODUCTION

Cultural chronologies, based on absolute and/or relative dates, add historical perspective to archaeology (Shepard 1965:341). Considered a sensitive indicator of stylistic trends, and useful in tracing cultural change and interaction through time and space (Rice 1987:435-436; Sinapoli 1991:74-81), ceramics have long been used in conjunction with chronometric techniques for seriation and cross-dating purposes (Adams 1979; Rice 1987:436). Ceramics have also been used recently to supplement glottochronological data in research examining population expansion in the Northeast (Fiedel 1990).

Principles of seriation, the time-ordering of data (e.g., types or attributes), were first applied to ceramics in the American southwest by A.L. Kroeber (1916). However, broad regional sequences for eastern North America were not established until between 1940 and 1960, and even these were based on small samples, some mixed assemblages, and relied on relative dating techniques (Petersen 1985:6). Although ceramic sequences continue to be of wide interest to archaeologists in the Northeast a region-wide chronology is still insufficiently developed (Ritchie 1985:416). In particular, the absence of an objective and standardized terminology has hampered ceramic analysis, and, in particular, the development of accurate ceramic based chronologies in the Northeast (Petersen 1985).

In a recent article, Petersen and Sanger (1991) presented a preliminary seven part ceramic sequence, or chronological model, for Maine and the Maritime Provinces (Table 1.1) designed, in part, to stimulate

further research. This chronological sequence was based on 165 radiocarbon dates associated with ceramics from 76 sites in Maine, the Maritime Provinces, and adjacent areas. Petersen and Sanger stressed that their observations derived largely from the analysis of over 1200 fragmentary vessels from Maine and adjacent areas in New England, and just over 400 vessels from the Maritime Provinces. It is possible that some of the regional differences they ascribe to the ceramic assemblages from New England, Maine and the Maritime Provinces may simply reflect the proportional amounts of research devoted to each area. While many of the radiocarbon dates they cited were associated with sites from the Maritime Provinces (i.e., 37%), Prince Edward Island was excluded, and Nova Scotia was the least intensively studied province. In fact, only nine of the 76 sites examined in this region, or 11.8 % of the total sample, were from Nova Scotia. Their study clearly indicated that more research was needed on Nova Scotian collections in order to correct the existing imbalance.

Current Research Objectives

The focus of my research has been the ceramic assemblage from Eel Weir site in Kejimkujik National Park, which has produced the largest *in situ* collection of prehistoric ceramics with associated radiocarbon dates from southwestern Nova Scotia. A detailed stylistic and morphological analysis of ceramics from Eel Weir and ten other sites was undertaken in order to evaluate the applicability of the Petersen and Sanger chronological model to southwestern Nova Scotia (Figure 1.1). Further, it permitted a more thorough incorporation of this area into the regional chronology.

Table 1.1

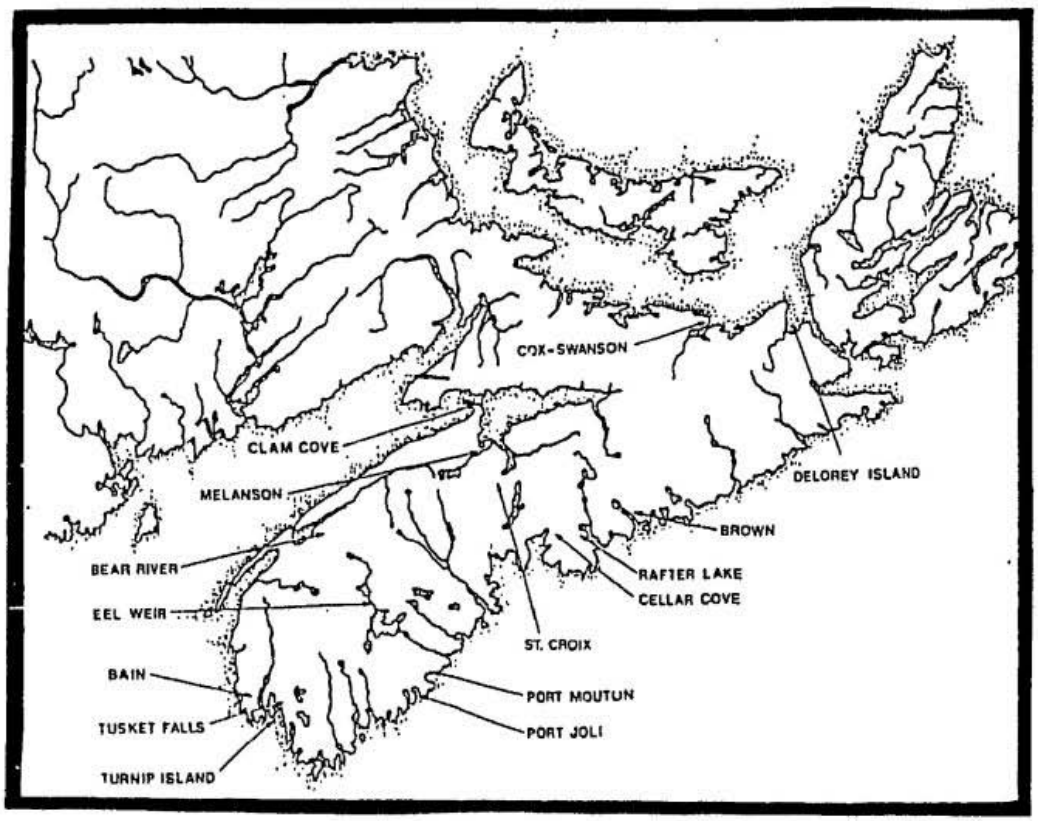
Temporal Equivalents for Ceramic Period Subdivisions.

CERAMIC PERIOD SUBDIVISION	TEMPORAL EQUIVALENT	ALTERNATIVE DESIGNATION
1	ca. 3050-2150 B.P.	Early Ceramic/ Woodland Period.
2	ca. 2150-1650 B.P.	early Middle Ceramic/Woodland Period.
3	ca. 1650-1350 B.P.	middle Middle Ceramic/Woodland Period.
4	ca. 1350-950 B.P.	late Middle Ceramic/Woodland Period.
5	ca. 950-650 B.P.	early Late Ceramic/ Woodland Period.
6	ca. 650-400 B.P.	late Late Ceramic/ Woodland Period.
7	ca. 400-200 B.P.	Contact/ Protohistoric Period.

after Petersen and Sanger 1991

Figure 1.1

Map of Study Region Including Sites Mentioned in Text.



The above-mentioned collections were reduced to vessel units based on attribute correlations. This data was recorded using the dBase III Plus computer program to facilitate future reference, modification and comparative analyses. Although this data is used here almost exclusively for chronology building, it will ultimately be useful for addressing other important research topics such as the analysis of technological development, the identification of spatial and temporal boundaries, and the recognition of ethnic groups and population movement through examination of design motifs and "grammars" (Custer 1987:97).

In Chapter Two, I present a detailed review of previous ceramic research in the Maine-Maritimes Region, culminating in the Petersen and Sanger model. In Chapter Three, I present my own research in southwestern Nova Scotia. In Chapter Four, I compare my findings with the Petersen and Sanger model and discuss several minor problems related to the development of ceramic chronologies in the Northeast.

CHAPTER 2

HISTORY OF CERAMIC RESEARCH IN THE MAINE/MARITIMES REGION.

Maritime Provinces (Pre-1980).

The earliest research on prehistoric Northeastern ceramics appeared in a number of 19th century reports. Northern Europeans had begun excavating shell middens, or Kjoekkenmoddings, and this activity quickly attracted the attention of Northeastern naturalists who then initiated their own research.

In Nova Scotia, these early accounts offered insightful descriptions of local shell middens and their contents. If ceramics were mentioned, it was usually incidental and in limited detail (e.g., Jones 1864, Gossip 1864). This lack of attention may have been due, in part, to a belief by some in the mid to late nineteenth century that the Micmacs did not make pottery in prehistoric times (Patterson 1890:251). However, that this belief was not shared by all was indicated by the Reverend George Patterson who stated that "...though no perfect vessel has been found ... considerable quantities of fragments have been discovered, sufficient to show the state of art among them" (1890:251).

Little more than a decade later in Nova Scotia there developed a heightened interest in ceramic artifacts, as is illustrated by correspondence between Honeyman (1879) and DesBrisay (1879) in which increased attention was given to clay composition, vessel morphology, decoration, function, antiquity, and cultural context. In 1890 Patterson initiated recognition of the cultural significance of prehistoric Micmac ceramic technology by including a brief section on pottery in a published report. In addition to descriptive accounts of vessel morphology,

function, decoration and temper type, Patterson suggested a possible ceramic "manufactory" location at "a spot on the Lahave River above Bridgewater, in Lunenburg County", and speculated about the tools used to decorate the vessels (Patterson 1890:251).

Interest in archaeology was also growing in New Brunswick during the late 19th century. Departing from simple artifact description, archaeological interest first expanded in the form of reconnaissance type research into the potential of navigable waterways for prehistoric sites (Bailey 1887). Ceramics recovered by Bailey (1887), both from interior sites and coastal shell middens, were described in terms of texture, exterior surface appearance, decoration and extent of firing.

After 1894, enthusiasm in archaeological research in Nova Scotia waned, only to be briefly revived in 1914 with the excavations of Smith and Wintemberg (1929). A detailed account of northern Nova Scotian ceramics was included in this report. Although rich in description, prehistoric ceramics were not as yet analyzed in terms of chronological significance. Wintemberg later recorded his impressions regarding the geographic distribution of ceramics in Canada and the United States in a paper published posthumously (Wintemberg 1942). In an attempt to discover the possible origins and/or cultural affiliations of ceramics specifically from the Northeast, Wintemberg drew from attributes such as geographic distribution, vessel morphology, decoration and temper type. Wintemberg also employed McKern's classificatory system and Ritchie's Owasco and Vine Valley Aspects of the Northeastern phase (Ritchie 1936), from which he derived his Woodland pattern.

It was not until the late 1950's and 1960's that archaeological

research in Nova Scotia was resumed substantially in the work of John Erskine (1958), an amateur, and George MacDonald, a professional archaeologist (1968). Despite the promising nature of this work, archaeological research in Nova Scotia remained inconsistent until recent times (Sheldon 1987:7). In New Brunswick, however, interest in ceramics was reflected by a detailed description of a nearly complete ceramic vessel from Maquapit Lake (Matthew and Kain 1904). Speculation about vessel function, cooking technology, method of manufacture and decoration indicated that interest in ceramic technology was not substantially declining. In 1909 the Natural History Society of New Brunswick published a series of photographs of sherds recovered from Bocabec and Grand Lake by William McIntosh (1909) who estimated the geographic distribution, and to a limited extent, the type of culture characteristic of the prehistoric ancestors of the Malecites. This article also presented the author's personal impressions on the age of the pottery, followed by the usual comments on size, shape and manufacture methods.

In the late 1950's in Nova Scotia, Erskine documented the prehistoric ceramic assemblage retrieved from the Bear River, Indian Gardens and Port Joli sites in soutwestern Nova Scotia (Erskine n.d.; 1958). Although eager to establish ceramic types, Erskine ultimately felt obliged to discard his own classifications indicating that they were based on "nothing more than favorite patterns of individual potters" (Erskine 1958:366). Attempting to discern the chronological significance of ceramic forms, Erskine tabulated data on decoration, clay color, and surface finish (Erskine 1958:367). Although he did not publish any final impressions in this report, his unpublished memoirs are more

chronologically oriented (Erskine n.d).

Ceramic analysis was included in a few archaeological reports in Nova Scotia during the 1970's (Myers 1972, Davis 1974, Connolly 1977). Myers' 1972 survey report of Kejimkujik National Park included limited information on the ceramics recovered from test excavations at six sites (Myers 1972). Ceramics from the Merrymakedge site were categorized into types based on rim sherd attributes including morphology, paste, temper type and decoration. Body sherds were compared on the basis of frequency of decoration types, but were not examined in conjunction with rim sherd types. Ceramics were only briefly described for the remaining sites and there was no attempt to analyze the collection since this was only a survey report.

In 1974 Davis described a restored vessel recovered from a shell midden near Commeau's Hill, Turnip Island in Yarmouth County, Nova Scotia (Davis 1974). Lack of common knowledge regarding the chronology of prehistoric Nova Scotian ceramics at that time forced Davis to estimate the vessels' temporal position. (Davis 1974:5-6).

A few years later, Connolly re-examined materials from the Bear River site, Digby County, recovered by Erskine in the late 1950's and Davis in the early 1970's (Connolly 1977). Connolly indicated that the traditional method of defining exterior decoration by types or attributes, comparing them to other ceramics from the region and then establishing a chronology was impossible due to the unprofessional nature of Erskine's investigations (Connolly 1977:43).

Maine and Adjacent Areas of New England (Pre-1980).

Ceramic studies in Maine had an equally inauspicious beginning, and only a single paragraph was devoted to Maine in W.H. Holmes' (1903:179) impressive volume entitled "Aboriginal Pottery of the Eastern United States".

Nearly a decade after the turn of the century, in western Vermont, research into ceramic origins and geographic distribution was based on the fundamental attributes of form, temper and decoration (Perkins 1909). Perkins also compared the ceramics of western Vermont to those of eastern New York and those west of the Adirondacks. In the same year, Charles Willoughby (1909) presented a paper, which, in addition to recognizing the existence of a pre-ceramic culture, divided the New England ceramic base into three chronological and geographic categories, namely, the Archaic Algonquian, Later Algonquian and Iroquoian. The ceramics of the Archaic Algonquian, restricted to Maine and Massachusetts, were described in terms of decoration, temper, paste and vessel manufacture. Willoughby maintained that ceramic technology was not an indigenous development and that infrequent contact with the Iroquois left ceramic style unchanged until historic times (1909). The Later Algonquian, located in western, southern and central New England, and on rare occasion in Maine, persisted as recently as AD 1674, with most of the samples being recovered from proto-early historic graves. Willoughby detected a trend toward Iroquoian influence and attributed this to constant Mohawk raids in the area. Willoughby's attention to culture and technology was unprecedented in its time and today remains a valuable source of information.

Following Willoughby (1909), ceramic related research in the eastern

United States continued to develop. Technological debates deriving from historical documentation and the archaeological record ensued (e.g. Fairbanks 1937). Research into ceramic technology was accomplished through ethnographic analyses (Fewkes 1941), and ceramics from archaeological sites were described in terms of attribute data (Sherman 1946) and often categorized chronologically (Griffin 1942; Smith 1944; Fowler 1948). With increased ceramic information, attempts were made to define cultural differences through ceramic type categories, seriation and chronological progression (Ritchie and MacNeish 1949). However, the applicability of ceramic typologies was not always widely recognized nor accepted, and was often subject to criticism (Carpenter 1953; Pratt 1960). Ceramic technology and style were also occasionally explained in terms of cultural migration (deLaguna 1940; Rouse 1945; Fowler 1946).

Great strides in ceramic research were being made by William J. Howes, a regular contributor to the Bulletin, produced by the Massachusetts Archaeological Society. In addition to covering subjects such as surface finish (1954b), and range of form and decoration (1954c), Howes inadvertantly applied the ceramic ecology approach (Matson 1965) a decade prior to its formal definition, as he considered clay sourcing and ceramic analysis in a cultural/social context (1943; 1956). Howes, along the lines of Fowler (1948), later speculated on the origins and course of development of ceramic technology and the direction of early influence (1954a). Experimental analyses replicating decoration forms and tools were also conducted in New England at this time (Carpenter 1943; Quimby 1948).

With the advent of radiocarbon dating, chronological assessments were

no longer based on stratigraphy and intuition alone (Fowler 1956; Fowler 1966), although typological seriations were still based on attribute analyses (Kaeser 1964). Description of ceramics from archaeological sites continued (Howes 1960) as did experimental/replication studies (Quimby 1961). Ceramics were usually described in terms of four chronological stages which had been identified and later redefined by Fowler (1948; 1966). Possible origins for ceramic technology were hypothetically extended to the Old World (Kehoe 1962), as were potential sources of ceramic stylistic influence (Greengo 1960). In the early 1960's, in New England, amateur archaeologists were also documenting their finds in the Massachusetts Archaeological Society Bulletin (Viera 1962; Bielski 1962).

During the late 1960's and early 1970's, some ceramic analysts in the eastern United States continued to apply Fowler's chronological stages to ceramic assemblages (Fowler 1966; Feher 1970). Ceramics from archaeological sites were described at the attribute level (Weeks 1971; Feher 1976), and occasionally categorized into wares (Bourque 1971). In addition to speculating on vessel function and technology some archaeologists were interested in improving chronology building and inter-site comparisons through identification of diagnostic traits (Maslowski 1973; Dincauze 1975). For example, detailed attribute analyses revealed temporal and/or geographic differences when comparing ceramics from two different cultures in the Hudson Valley of New York State (Brumbach 1975). Attention was also given to problems related to typological studies (Kraft 1975). Less customary research included an interest in prehistoric cultural traditions such as aboriginal eating habits (Fowler 1975), while amateur archaeologists continued to publish their finds in the

Massachusetts Archaeological Society Bulletin (Scothorne 1971; Farmer 1975). Experimental analyses involving decorating tools and prehistoric sherds also continued (Arthurs 1973).

In the latter part of the 1970's, concern with the origin and development of ceramic technology was the source of an extensive debate (Brennan 1975; Wise 1975, Gardner 1975; Kinsey 1975). At the end of the decade sufficient progress had been made to produce an overview of Woodland Period sites, including information regarding artifacts, site reconstruction, settlement and subsistence patterns, and methodology (Sanger 1979). Sanger, at this time, also introduced the use of the term "Ceramic Period" which was intended to replace the "Woodland Period" designation (1979).

By the 1980's, archaeologists were generally assigning their ceramics to three broad Woodland or Ceramic Periods based on attribute/vessel lot analysis (Dincauze 1975; Keenlyside 1978; Nash and Stewart 1986; Sheldon 1987; Kristmanson 1990). Further, before the development of Petersen and Sanger's model (1991), pseudo-scallop shell, dentate stamp, and cord wrapped stick design elements were often considered to correspond broadly with the Early, Middle and Late Ceramic Periods. Petersen and Sanger's model may ultimately replace this tripartite system for the Maine-Maritimes region.

Maine and the Maritimes (Post-1980).

During the 1980's ceramic analysis became a significant component of archaeological research in the Maine-Maritimes region. Closer attention was given to provenience and recognition of different "types" based on

attribute analysis (Doyle et al. 1982; Nash and Stewart 1986; Kemp 1987). Radiocarbon and thermoluminescent dating techniques continued to enhance efforts to order ceramic material chronologically. Towards the end of the decade, and into the 1990's, attribute analyses and the recognition of ceramics as a significant branch of the larger site assessment has resulted in improved ceramic analyses (Allen 1981; Foulkes 1981; Allen 1983; Bishop 1983; Hedden 1983; Kristmanson 1990, Petersen and Sanger 1991). The advent of petrographic and chemical analyses, inter- and intra-site comparisons, and an expanding and more concise terminology has contributed to a growing body of knowledge relevant to temporal and spatial concerns (Petersen, Hamilton, LaBar 1984; Sheldon 1987). Other areas of interest, such as the analysis of behavioural implications associated with the spread of ceramic technology (Petersen, Hamilton and Labar 1984), and related cultural manifestations, will continue to direct the course of ceramic analyses in the future.

Petersen and Sanger's Chronological Model

Petersen and Sanger's model represents the most recent refinement of the chronology for the Northeast on the basis of ceramic evidence (1991). As Table 2.1 demonstrates, the attributes, or modes, contributing most significantly to this analysis includes those of temper, surface finish, and decoration (1991). Additional attributes considered to be sensitive as spatial or temporal indicators were vessel morphology (where applicable) and the fiber twist, spin and weft slants characteristic of the perishable fiber industry. Other attributes were occasionally added to the Ceramic Period vessel descriptions.

The ceramic collections from southwestern Nova Scotia were examined with respect to these and other attributes in order to discern the temporal and spatial relevance of the model for ceramics from this region.

Petersen and Sanger divided the traditional three-part Ceramic or Woodland Period into seven shorter periods, each characterized by distinct ceramic assemblages. The Early Ceramic (Woodland) period dates from approximately 3050 BP to 2150 BP. None of the Nova Scotian material examined by Petersen and Sanger demonstrated an affiliation with this period. Ceramics from this period, according to Petersen and Sanger, were typically undecorated, grit tempered vessels with simple rims and rounded lips (Table 2.1). Manufactured by the coiling method into conoidal or beaker-like shapes, the vessels were small, usually of a four liter capacity or less. Exterior and interior surfaces were fabric paddled and frequently betrayed evidence of smoothing over one or both surfaces (cf. Custer 1987:99-104; Mitchell 1990). Exceptions to the rule were vessels found in mortuary contexts in Maine, New Brunswick and Vermont, where incision and singular or multiple punctations were noted.

The second division, designated the early Middle Ceramic (Woodland) period, included ceramics from two sites in Nova Scotia: the Bear River 1 site, in the Annapolis Basin which dated to 2125 +/- 65 BP (S-158; Connolly 1977; MacIntyre 1983; Wilmeth 1978), and the Bain site in Yarmouth, dating to 2000+/-80 BP (Beta-28027, Beta-28029; Sanger and Davis 1990). This period was characterized by Petersen and Sanger as a zenith in technological and decorative skill. Temper type, method of manufacture and vessel morphology remained unaltered since CP 1, except for

Table 2.1

Selected Morphological Attributes From Petersen and Sangers' Model.

		ATTRIBUTE			
CP	TEMPER	RIM FORM	LIP FORM	BODY FORM	MANUFACTURE
1	GRIT	STRAIGHT	ROUNDED	CONOIDAL	COILED
2	GRIT	STRAIGHT	ROUNDED	CONOIDAL	COILED
3	GRIT (a)	STRAIGHT	ROUNDED	CONOIDAL	COILED
4	GRIT (b)	STRAIGHT/ EXCURVATE	ROUNDED	CONOIDAL	COILED
5	SHELL	STRAIGHT/ EXCURVATE	ROUNDED	CONOIDAL/ GLOBULAR	COILED
6	SHELL(c)	STRAIGHT/ EXCURVATE	ROUNDED	GLOBULAR	COILED
7	GRIT	STRAIGHT/ EXCURVATE	ROUNDED	GLOBULAR	COILED

(a). Shell/organic in some areas.
(b). Shell/organic first appears on limited basis.
(c). Some grit in coastal, more interior, areas.

Table 2.1 (continued)

Selected Morphological Attributes From Petersen and Sangers' Model.

	ATTRIBUTE	
CP	DECORATION/APPLICATION	VESSEL CAPACITY
1	FABRIC PADDLED EXTERIOR/ INTERIOR.	4 LITERS, OR LESS.
2	PSEUDO SCALLOP SHELL, UNNOTCHED LINEAR FORMS, DENTATE, SIMPLE STAMPED AND ROCKED. INCISION, NON-STANDARDIZED PUNCTATES.	4 LITERS, OR LESS.
3	DENTATE, ROCKED. CIRCULAR AND LINEAR PUNCTATES. FABRIC PADDLED WITH SMOOTHED INTERIORS. POSSIBLE APPEARANCE OF CORD WRAPPED STICK.	4 LITERS, OR MORE.
4	CORD WRAPPED STICK, ESPECIALLY WITH SYSTEMATICALLY PLACED, CYLINDRICAL PUNCTATES. WAVY LINE PSEUDO SCALLOP SHELL IN SOME AREAS. INCISION AND TRAILING ASSOCIATED WITH CIRCULAR PUNCTATES. LATE CP4, FABRIC PADDLED EXTERIOR MORE COMMON. UNDECORATED, OR PUNCTATE ONLY.	4-8 LITERS
5	CORD WRAPPED STICK, SIMPLE VERTICAL STAMP AND CIRCULAR PUNCTATES. INCISION AND LINEAR PUNCTATION. FABRIC PADDLED EXTERIOR.	4-8 LITERS
6	CORD WRAPPED STICK AND LINEAR PUNCTATE. CIRCULAR PUNCTATES DECREASE/ DISAPPEAR. POSSIBLE INCREASED USE OF FABRIC PADDLING WHERE IT OCCURRED.	4-8 LITERS
7	FABRIC PADDLED, INCISION, CORD WRAPPED STICK, UNDECORATED.	4-8 LITERS

the introduction of castellated rims. A wide variety of pseudo-scallop shell stamps was considered to be highly diagnostic of CP 2; other forms of decoration included the dentate stamp and unnotched linear forms. Tools were applied in simple and/or rocker motion. The drag, or push-pull technique appears to have been common only in specific areas (e.g., the Oxbow site, New Brunswick), and is not ascribed to any of the ceramics from Nova Scotia for this period. Incisions were frequently combined as right and left oblique elements on the lower body of the vessel. Punctations were of varied shapes. Surface finish included interior channelling which was produced by scraping a toothed instrument on the surface, and smoothing of both surfaces.

Ceramic Period 3, the middle Middle Ceramic (Woodland) period, dates from circa 1650 BP to 1350 BP. Nova Scotia is represented by the Ben Francis site in Indian Bay N.S. which dates to 1465 +/- 80 BP and 1345 +/- 85 BP (I-9693 and I-9694; Nash 1978; Sheldon 1988). During this period, an increase in vessel size and wall thickness in the rim area, and perhaps the entire body, was accompanied by a switch to a less standardized vessel form. Some vessels had thickened rims or low collars. At the end of CP 3 and into CP 4, additive rims came into being. Grit was still the predominant temper type, although evidence of shell tempering is indicated. In addition to increased vessel size there appears to have been a concomitant increase in tooth size of the dentate stamping tools. Dentate stamp became the dominant decoration during this period at the eventual expense of the pseudo scallop shell design, while rocker stamping became the preferred application. Punctations were produced in a variety of circular and linear forms which appeared on the vessel surface in a

closely spaced rather than random arrangement. The cord wrapped stick design element possibly made its appearance during this period. It is also possible that undecorated vessels fabric paddled on the exterior and with the interior surface only smoothed were in manufacture at this time in the study region.

Ceramic Period 4, the late Middle Ceramic (Woodland) period dates from ca. 1350 BP - 950 BP. Although not selected to represent CP 4, two sites from Nova Scotia are listed in the Appendices for this period, namely, the Whynacht Cove site in Mahone Bay, and the Brown site in Jeddore harbor, respectively dated to 1290 +/- 75 BP (S-183; MacIntyre 1983; Wilmeth 1978) and 1230 +/- 70 BP (Beta-14052; Sheldon 1988). Vessels continued to be of conoidal form with simple straight to slightly excurvate rim forms; some vessels had low collars or thickened rims. During CP 4 vessels were generally of a small to medium size and capable of holding four to eight liters. Functional differences may be indicated by the presence of some smaller vessels. CP 4 witnessed the disappearance of the rocker and drag stamp applications in addition to the dentate stamp design element. The diagnostic attributes assigned to this period are cord-wrapped stick design and distinctly arranged punctations of a consistently cylindrical shape. Other minor forms of punctations included linear and crescentic or fingernail forms which diminished in frequency during this period. Wavy line or pseudo scallop shell-like tools were employed at this time along with incision and trailing which were particularly noted in association with circular punctations. Although seen less in Maine and the Maritime Provinces, fabric paddled exteriors became more common towards the end of CP 4 with a decrease in

smoothed exterior surfaces. Some vessels exhibited exclusively circular punctations, while others were simply left undecorated. During the later portion of this period shell temper was used to a limited extent. A further diagnostic characteristic is the restriction of design motifs to the upper vessel exterior surface with a large portion of the exterior body surface left undecorated.

Ceramic Period 5, the early Late Ceramic (Woodland) period dates from ca. 950 to 650 BP. Four sites were selected to represent this period for Nova Scotia. The Cox/Swanson site in the Northumberland Strait, returned dates of 840 +/- 60 BP and 700 +/- 45 BP (S-1603 and S-1604 respectively; Keenlyside, pers. comm.). The Eel Weir site in Mersey River was dated to 790 +/- 100 BP (Beta-6363; MacIntyre 1983; Sheldon 1988). The Brown site in Jeddore Harbor, N.S. dated to 740 +/- 60 BP (Beta-15479; Sheldon 1988), and the Whynacht Cove site in Mahone Bay, gave a radiocarbon date of 900 +/- 50 BP (S-154; MacIntyre 1983; Wilmeth 1978).

The predominant choice of decoration during this period was the cord wrapped stick design, usually simple stamped. Typically used as a secondary form of decoration, circular punctation was applied most commonly in association with the cord wrapped stick and rarely in isolation. Linear punctations and incision were also characteristic decorative attributes of this period. The average diameter of the cordage employed in composite tools as well as the diameter of punctates was seen to decrease sometime between CP 4 and CP 5. As these features of the decorative elements decreased, the vessel size, capacity and thickness were latently increasing although still of conoidal shape. Straight to excurvate simple rim forms persisted, mostly without collars or other

modifications to the rim. By the end of CP 5 more globular vessel forms were in use as the conoidal shape eventually disappeared. Surface finish during CP 5 included smoothed, smoothed over fabric paddled, and fabric paddled exterior surfaces. Vessels continued to be of coil manufacture although at this point shell was the dominant tempering material.

The remaining Ceramic Periods, CP 6 and CP 7, were originally combined by the authors, however their radiocarbon dates may be used to conveniently divide them into their relevant chronological position.

The late Late Ceramic (Woodland) period, or Ceramic Period 6, dates from ca. 650 to 400 BP. Of the three sites reported from Nova Scotia the Brown site in Jeddore Harbor (Sheldon 1988) was selected to represent the combined periods based on dates of 530 +/- 60 BP and 280 +/- 70 BP (Beta 15480 and Beta-15481). Clearly the latter date represents the Contact Period, while the former is unquestionably affiliated with CP 6. Other sites (Petersen and Sanger 1991:Appendix 7.6) are the Eel Weir site on the Mersey River, which dated to 470 +/- 60 BP (MacIntyre 1983; Sheldon 1988), and the Indian Point site in Cape Breton which dated to 465 +/- 80 BP (I-9695; Nash 1978). Both of these sites produced radiocarbon dates which place them directly on the temporal border between the final Ceramic Periods.

CP 6 represents the final period during which ceramics were manufactured on a regular or fairly intensive level. Cord wrapped stick continued to dominate as a decorative element, while circular punctation became less common and possibly disappeared in favor of the linear form. The use of fabric paddling on exterior surfaces, where it was in use, possibly increased during CP 6. Shell was the dominant tempering material

although there was some increased use of grit in coastal, but more often interior, areas. CP 6 ceramics demonstrated a remarkable decrease in wall thickness, (i.e., as much as 60 - 80 % reduction). Globular vessel forms replaced the conoidal shape and a certain measure of Proto-Iroquoian influence was detectable. The latter was manifested in thinner vessel walls, the globular shaped body, altered rim configurations, and the use of extrusive collars on the upper rim. Incision decorated and collared vessels were rare to absent in much of the Maritime Provinces area during and after CP 6, but were present in parts of the St.John River Valley in New Brunswick, and Maine.

The Contact Period, dating from approximately 400 to 200 BP, is labelled Ceramic Period 7 in the Petersen and Sanger model. Aboriginal ceramic manufacture was abandoned during this period due to the availability of European substitutes such as "copper kettles" (e.g., Monahan 1990:14-20). Vessels were thin walled, fabric paddled, incision decorated and collared. Grit temper was dominant whether in a coastal or interior setting, however, this is best demonstrated for the state of Maine. Vessels from eastern New England, Maine and the Maritime Provinces did not exhibit proto-Iroquoian or Iroquoian influence. The feature that distinguishes CP 7 ceramics is the conspicuous European influence documented in a trend towards aboriginal use of ceramics strictly as burial offerings or storage containers. European influence was also seen in the aboriginal manufacture of ceramic plates (Petersen and Sanger 1991). The inhabitants of the Maine-Maritimes region appeared to have persisted in ceramic manufacture at least until after A.D. 1675 (Petersen and Sanger 1991). It is suggested that the locally distinctive ceramics

from the Maritimes in CP 6 may substantiate the idea that ceramics experienced little change following CP 6. This situation, creating difficulties in distinguishing between CP 6 and CP 7 ceramics, may explain the dearth of ceramics found in CP 7 associations.

CHAPTER 3

CURRENT RESEARCH IN SOUTHWESTERN NOVA SCOTIA.

Eleven ceramic collections from southwestern Nova Scotia sites provided the ceramic sample used for this project (see Figure 1.1). The Eel Weir VI (BbDh-6) collection was borrowed from Environment Canada, Parks, Halifax, Nova Scotia. The Canadian Museum of Civilization in Hull, P.Q., provided the ceramics from the Cox-Swanson (BkCq-10), Bear River (BdDk-1), Tusket Falls (AlDl-1), Port Mouton I and IV (AlDf-1; AlDf-3), Port Joli XII (AlDf-3), and Melanson (BgDb-2,3,5,7) sites. Three private collections were borrowed from Mr. Jim Legge (JSL), Mr. Ellis Gertridge (EFG), and Mrs. Marge Hirtle (MEH). The St. Croix (BfDa-1) and Clam Cove (BhDc-5) collections were available at Memorial University of Newfoundland. Some of the collections borrowed from the Canadian Museum of Civilization were incomplete, with the remainder of each being housed at the Nova Scotia Museum in Halifax. This research included only those sherds borrowed from the National Museum. However, the collections in Nova Scotia which would complete each of these site assemblages were accessible through documentation (MacIntyre 1983; see below).

Methodology

Each of the ceramic collections was subjected to attribute analysis (Figure 3.1) and the information was subsequently entered into a dBase III Plus program (see Figure 3.2). The database management system is used to systematically organize, manage and manipulate a large collection of information (Chou 1986) such as an archaeological artifact assemblage. Appendix B provides the code used to enter the attribute information into

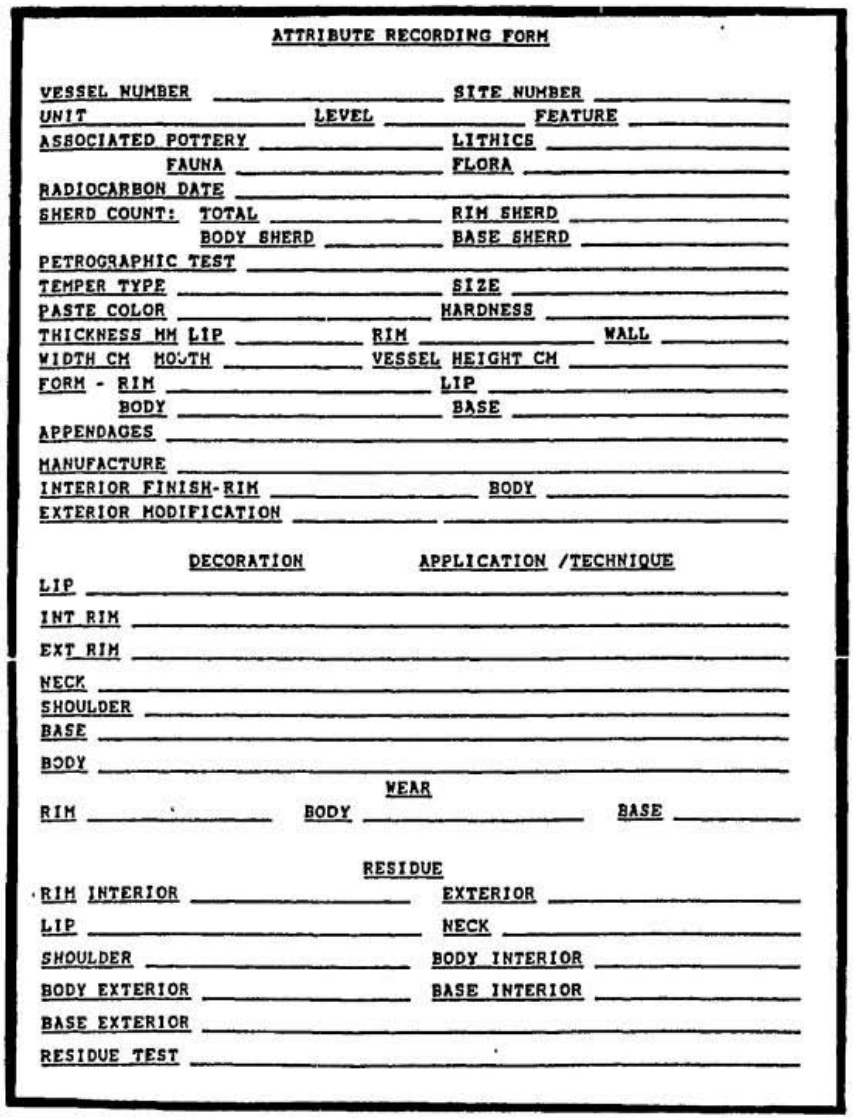
the dBase program. One of the benefits of employing such a code is that new categories can be added *ad infinitum* to each field of information. The program is also flexible enough to modify existing data as new information becomes available.

As a methodological approach, attribute analysis is preferred as it provides a more accurate description of the sample and permits broader, culturally significant inter- and intra-site comparisons (Petersen 1985:9-10). By organizing sherds into vessel units based on attribute similarities and differences, the traditional problems associated with simple typologies and rim sherd analysis (Keenlyside 1978:327) are avoided since the procedure followed in attribute analysis accommodates for the fact that a single vessel may be represented by one or one hundred sherds (Keenlyside 1978:326-327). Moreover, the sherds from all portions of the vessel contribute to an attribute analysis and expand the amount of information to be gleaned from the artifacts.

Vessels were illustrated in a standardized form for visual reference (Figure 3.3). Each drawing included a replication of the decorative elements found on the lip, rim exterior, interior and body. The profile of the rim was also depicted where possible. This procedure is useful in that it provides a reference from which to check the use of descriptive terminology.

Figure 3.1

Standardized Attribute Recording Form.



ATTRIBUTE RECORDING FORM

VESSEL NUMBER _____ SITE NUMBER _____
UNIT _____ LEVEL _____ FEATURE _____
ASSOCIATED POTTERY _____ LITHICS _____
FAUNA _____ FLORA _____
RADIOCARBON DATE _____
SHERD COUNT: TOTAL _____ RIM SHERD _____
BODY SHERD _____ BASE SHERD _____
PETROGRAPHIC TEST _____
TEMPER TYPE _____ SIZE _____
PASTE COLOR _____ HARDNESS _____
THICKNESS MM LIP _____ RIM _____ WALL _____
WIDTH CM MOUTH _____ VESSEL HEIGHT CM _____
FORM - RIM _____ LIP _____
BODY _____ BASE _____
APPENDAGES _____
MANUFACTURE _____
INTERIOR FINISH-RIM _____ BODY _____
EXTERIOR MODIFICATION _____

DECORATION APPLICATION /TECHNIQUE

LIP _____
INT RIM _____
EXT RIM _____
NECK _____
SHOULDER _____
BASE _____
BODY _____

WEAR

RIM _____ BODY _____ BASE _____

RESIDUE

RIM INTERIOR _____ EXTERIOR _____
LIP _____ NECK _____
SHOULDER _____ BODY INTERIOR _____
BODY EXTERIOR _____ BASE INTERIOR _____
BASE EXTERIOR _____
RESIDUE TEST _____

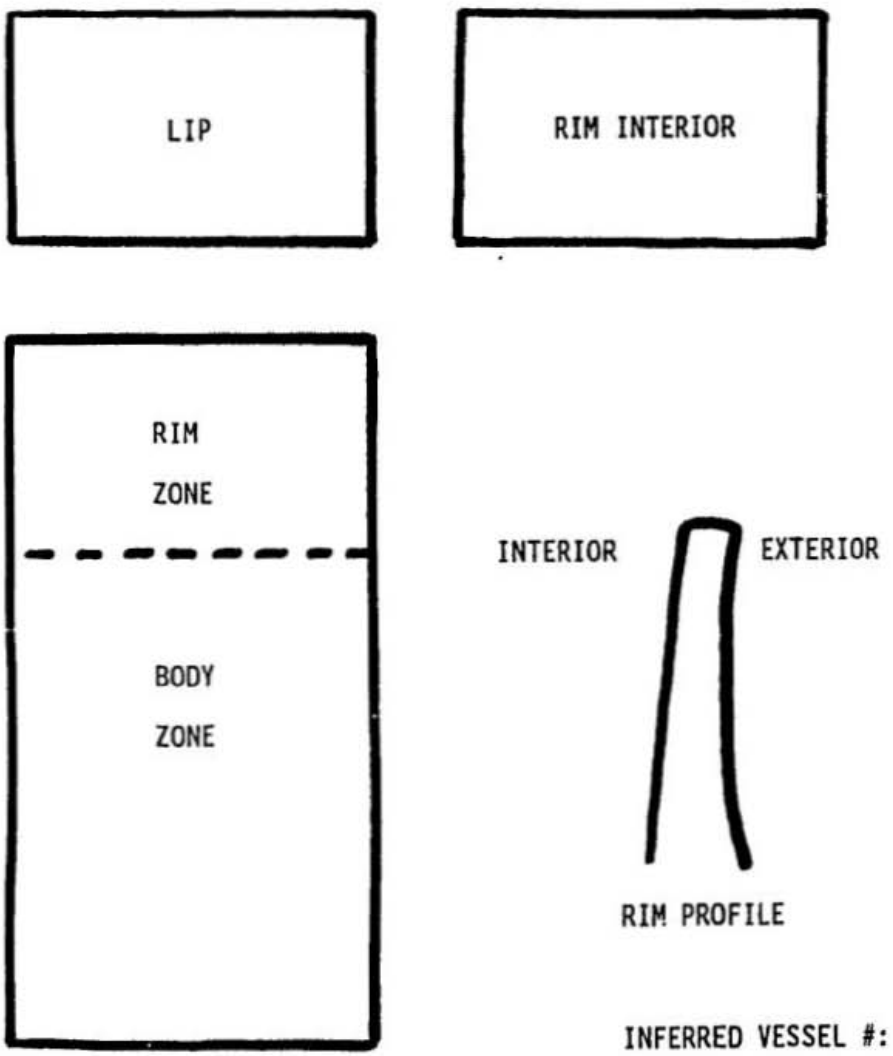
Figure 3.2

dBase File Structure.

Field	Field Name	Type	Width	Dec
1	SITENO	Character	10	
2	VESSELNO	Character	3	
3	UNIT	Character	15	
4	LEVEL	Character	5	
5	FEATURE	Character	3	
6	ASSOCCERAM	Character	3	
7	ASSOCLITHI	Character	3	
8	ASSOCFAUNA	Character	3	
9	ASSOCFLORA	Character	3	
10	RCDATE	Character	20	
11	TOTALCERAM	Character	4	
12	RIMSHERDS	Character	2	
13	BODYSHERDS	Character	3	
14	BASESHERDS	Character	2	
15	PETROTEST	Character	3	
16	TEMPERTYPE	Character	3	
17	TEMPERSIZE	Character	3	
18	PASTECOLOR	Character	10	
19	HARDNESS	Character	3	
20	LIPNA	Character	3	
21	RIMM	Character	3	
22	WALL	Character	2	
23	MOUTHCH	Character	2	
24	NECKHCH	Character	2	
25	RIMFORM	Character	5	
26	LIPFORM	Character	5	
27	BODYFORM	Character	5	
28	BASEFORM	Character	5	
29	APPENDAGES	Character	2	
30	MANUFACTUR	Character	3	
31	INTFIREUR	Character	4	
32	INTFINBODY	Character	4	
33	EXTMODIFIC	Character	2	
34	LIPDECO	Character	5	
35	LIPAPPLI	Character	5	
36	INRIMDECO	Character	5	
37	INRIMAPPL	Character	5	
38	EXRIMDECO	Character	5	
39	EXRIMAPPL	Character	5	
40	NECKDECO	Character	5	
41	NECKAPPLI	Character	5	
42	SHOULDECO	Character	5	
43	SHOULDAPPL	Character	5	
44	BASEDECO	Character	5	
45	BASEAPPLI	Character	5	
46	BODYDECORA	Character	5	
47	BODYAPPLIC	Character	5	
48	RIMWEAR	Character	3	
49	BODYWEAR	Character	3	
50	BASEWEAR	Character	4	
51	RIMRESIDUE	Character	3	
52	LIPRESIDUE	Character	3	
53	NECKRESIDU	Character	3	
54	BODYRESIDU	Character	3	
55	BASERESIDU	Character	3	
56	RESIDUTEST	Character	3	
57	CERAMPERIO	Character	10	
** Total **			254	

Figure 3.3

Standardized Vessel Illustration Form.



The standardized recording form (Figure 3.1) indicates that the sherds were analyzed at the attribute level and organized into vessel units. The basic criteria for assigning sherds to vessel units were provenience (if available), temper type, paste color and texture, surface finish and decoration. In all instances, if the information was unknown or unavailable, a zero was entered in the data field to indicate the absence of data. Every effort was made to conjoin sherds of similar attributes, since, in addition to precise vessel reconstruction, stratigraphic information based on artifact distribution and possible vertical displacement due to site disturbance could be revealed (Villa 1982:279-287). Each vessel was assigned a number and its location in the site was described in terms of excavation unit, stratagraphic level and the identification of associated features and their contents, if applicable. Excavation units were recorded alpha-numerically. Excavation level designation was based on cultural and/or natural level units and recorded alpha-numerically. Feature associations were recorded on a presence or absence basis, while artifacts associated with a feature were recorded as present, absent or numerically depending on what information was available (the exception being the category of "flakes only" under the lithics field which was represented alphabetically). Floral and faunal specimens considered to be in association with the vessel were recorded on a presence, absence or numerical basis, again depending on the nature of the available information.

If a radiocarbon or thermoluminescent date was recorded it was preceded by the letter G or D depending on whether the date was in general or direct association with the vessel (see below). If there was more than

one date available, the most recent was recorded on dBase while all appear on the recording form itself. This approach could be modified in future use of the program since it was only adopted as a means to conserve space. A numeral "1" in the data field indicated that a charcoal sample was available for dating purposes, but had not been used.

The sherd count recorded the total number of sherds from the vessel. Ideally, numbers less than ten should begin with a zero (i.e., 01, 02, 03...10) since the dBase program will not identify a 1 from a 10, a 2 from a 20, and so on. Rim, body and base sherd counts simply represent the number of sherds present from each region of the vessel and add up to equal the total sherd count. This information is useful for future analysts as it facilitates reconstruction of vessel units for re-examination, and reveals the degree of sherd deterioration since the previous analysis.

In some cases a petrographic test was performed on sherds from a given vessel. This was recorded on a presence or absence basis. Had a petrographic analysis been conducted, reference to the relevant documentation would be necessary for further information. A zero was entered into the data field if it was not known whether a petrographic test had been conducted.

A large number of the fields were given numerical designations as codes for attribute information. For instance, temper types were listed as grit=(1), shell=(2) and organic matter=(3).

Inclusion/temper size was recorded as fine (1), medium (2), and coarse (3), which corresponded to <1mm, 1-3mm, and >3mm respectively. This information was restricted to grit tempering material since shell and

other organic tempering material are often only represented by the vesicles left after firing.

Paste color was alphanumerically coded according to the Munsell Color Code guide. Hardness could be ascertained by means of a scratch test and coded as fingernail (1), window glass (2), and pocket knife blade (3) (after Rice 1987:356).

The maximum thickness of each vessel lip, rim and wall was measured in millimeters using slide calipers. This required that both surfaces of the sherd be intact. If they were not, then no measurement was attempted. The vessel orifice (mouth diameter) was measured when there was sufficient rim sherd present to obtain acceptable results. Sherds representing at least 5-10% of the vessel mouth were required to ensure accuracy (after Egloff 1973). Two methods were used to estimate the mouth diameter of a vessel. The first was to match the arc of the rim sherd interior on a diagram of measured concentric circles (after Egloff 1973; Rice 1987:223). The second was to directly trace the arc of the rim sherd interior to paper and to bisect that arc with a geometry compass. The radius of the arc was then doubled to obtain the diameter of the circle. The results were fairly compatible considering the lack of precision associated with working from imperfect arcs which have derived from asymmetrical orifices (Rice 1987:223; Bull 1989).

Vessel height was not often recordable since a large portion of the vessel is essential for proper measurement. From lip to base the measurement is recorded in centimeters.

Lip, body and base forms are depicted in Figure 3.4. Each shape was given a code number which could be checked further against the

standardized drawings of rim profiles (after Rice 1987).

Although rarely seen on vessels from the study region, appendages were considered and included as a data field. Attributes in this category included handles (1), effigies (2), and nodes (3). Effigies would include clay representations of humans or animals attached to the vessel surface. Nodes appear as protuberances on the vessel surface.

Vessel manufacture was recorded as coiled (1) or modelled/pinched (2) where identifiabled. Coiled vessels were characterized by the smooth, rounded surfaces where the coils have separated due to poor bonding. Modelled or pinched vessels were identified by the absence of coils or other separations in the clay as the process involves the manipulation of a single lump of clay into a small vessel or the base of a larger vessel (Rice 1987:125). In some instances the method of manufacture was not identifiable and the data field was completed with a zero.

Figure 3.4

Lip, Body and Base Morphology.

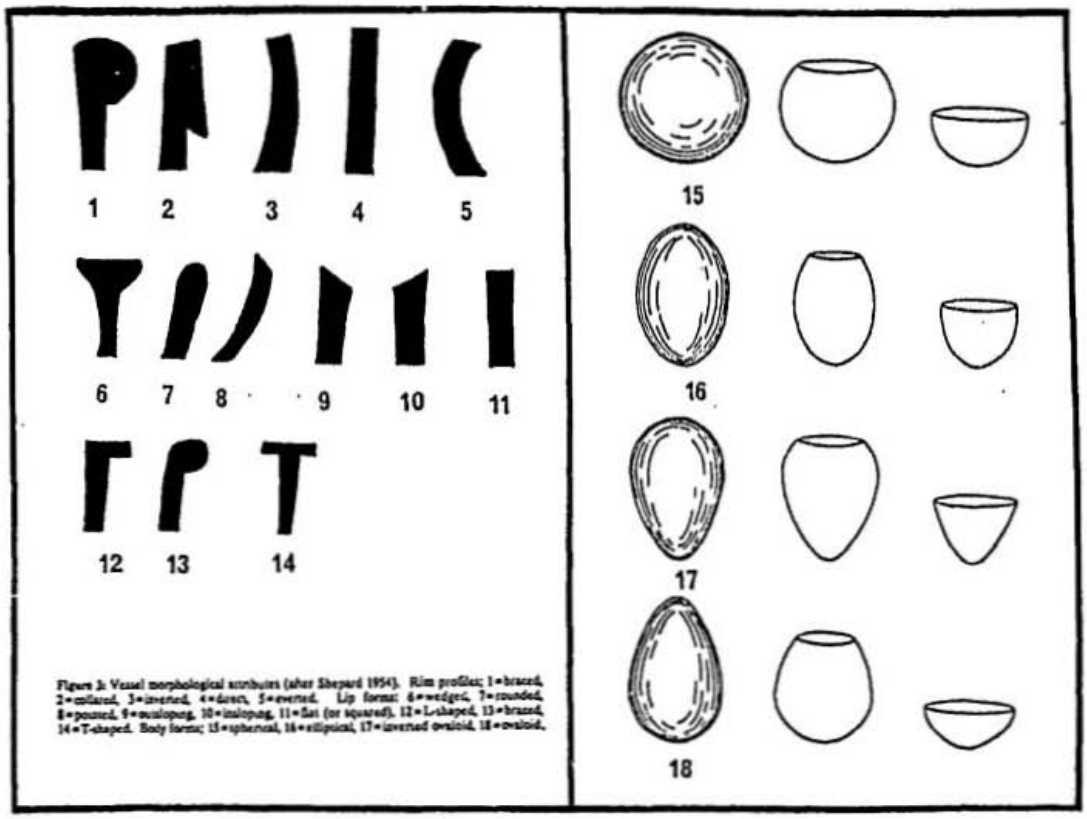


Figure 3: Vessel morphological attributes (after Shepard 1954). Rim profiles; 1=braced, 2=collared, 3=inverted, 4=direct, 5=everted. Lip forms: 6=wedged, 7=rounded, 8=pointed, 9=auriculate, 10=crenulate, 11=flat (or squared), 12=L-shaped, 13=braced, 14=T-shaped. Body forms; 15=spherical, 16=elliptical, 17=inverted ovaloid, 18=ovaloid.

After Deal and Kristmanson 1991:8

Surface finishing refers to procedures conducted during the vessel forming process which were designed to compact the clay surface (Steponaitis 1983:23; Rice 1987:136; Kristmanson and Deal 1991:20). The surface finish of the vessel interior and the method of application were combined to comprise a single data field.

Codes used for finishing tools and application methods were simply separated by a slash in the data field. For example, a vessel which had been stone smoothed would be coded as 4/9. The options listed in this category were derived from a previous study which examined surface finish, tools and techniques in detail (Kristmanson and Deal 1991).

Finishing tools included those used in decoration such as the dentate tool (6) and the cord wrapped stick (7). Natural tool materials included leather or wood (2), grass or twigs (3), stone (4), shell (5), and a sherd or flake (8). Assuming that all vessels were at least partly smoothed by hand (1), this was only recorded when it was the sole finishing technique (Kristmanson and Deal 1991).

Tool application techniques included smoothing (9), brushing (10), scraping (11), striating (12), and combing (13). Hard tools were generally used for scraping and soft ones for smoothing. Grass and/or twigs would be used to brush the vessel surface, and decorative tools for striating and combing. Striating refers to the parallel scoring of a vessel surface, while combing is an elaborate version of striating in which patterns such as chevrons or cross-hatches are formed (Rice 1987:140).

Exterior modification techniques were listed as trimming (1) and burnishing (2); both were rarely recorded for ceramics in the study

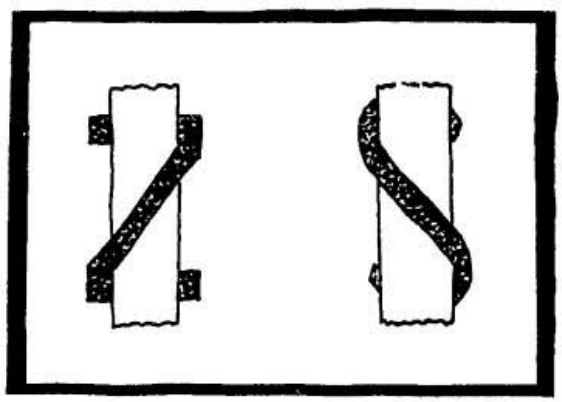
region. Trimming was defined as the cutting away of excess clay, while burnishing was interpreted as "a method of producing a luster on an unfired clay surface by rubbing it while leather hard with a hard, smooth object to compact and align the surface particles" (Rice 1987:473).

Coded descriptions of vessel decoration/tool form and application were divided according to vessel anatomy; however, codes were organized identically for each. For instance, the same code would be employed whether describing the decoration and application of the vessel rim, body, or base. The following paragraph outlines the different decorations and applications recorded.

Fabric-impressions (01) were recorded as decorations simple-stamped onto the vessel surface. Stamping tools included the alternating notched tool (2) which produces the pseudo scallop shell decoration, and the parallel notched tool (3) which produces the dentate decoration. The cord wrapped stick tool was identified and recorded under three different data fields including the S twisted cord wrapped stick (4), the Z twisted cord wrapped stick (5), and the cord wrapped stick tool of unidentifiable cord twist (10). Although the twist of the strands comprising the cord was sometimes visible, the direction in which the cord was twisted around the stick was the only attribute recorded (Figure 3.5). Recognizing that elsewhere, cords have been manipulated in several ways to produce a myriad of surface impressions, the simple and rocked stamp application of the cord wrapped stick and the manipulation of single cords were the only variations identified in the sample at this time (Hurley 1979:15). It is significant to note that this attribute was interpreted from the vessel surface, or a negative image (Hurley 1979:7). The pointed (6) and blunt

Figure 3.5

Examples of S and Z Cord Twist.



After Hurley 1979:6

(7) stylus were recorded as decorating tools used in incision, drawing and the application of punctations.

The unnotched straight edge (8) was used as a stamping, or perhaps drawing tool. The finger or fingernail (9) could be impressed or pushed into the vessel surface to produce a variety of impressions.

Application of decorative tool types included the simple stamp (1), in which the tool would be directly applied to the surface and removed in one motion. Applying the tool to the surface in a rocking motion, where the distal end of the tool remains in contact with the vessel surface at all times, was listed as rocker stamping (2). The distal end of a tool may have been drawn (3) across the surface or pushed into the surface leaving circular (4) or other shaped (5) punctations. A tool impressed into a protruding edge or surface, such as the lip, was described as leaving notches (6).

Evidence for use-wear on the vessel rim, body and base was also recorded as an attribute. Damage from repeated food processing would occur most frequently on the vessel interior at the base, the sides below the rim, and the exterior base (Hally 1983; Rice 1987:234). Damage would appear in the form of striae, pitted, and/or abraded areas; however, these marks were not frequently identifiable due to extensive erosion of sherd surfaces (see Chernela 1969; Griffiths 1978; Schiffer and Skibo 1989). Often, these marks are highly localized and difficult to identify without the benefit of complete vessels from which to draw inferences (Rice 1987:235; Schiffer and Skibo 1989). Use-wear damage recorded included marks resulting from natural abrasion (2) appearing as random scratches, abrasions, and scars which could not be attributed to cultural causes.

Those marks which appeared to be patterned as a result of human action included scratch marks (3), cracking (4), spalling (5), chipping (6), accidental or intentional perforation (7), cut marks (8), and pitting (9).

Each sherd was examined for residual food material such as soot (1), charred organic matter (2), or inorganic matter (3), adhering to the surface. The identification of carbonized remains is significant in that it has contributed to vessel use-wear and use-behaviour or function studies as well as diet reconstruction (Hastorf and DeNiro 1985; Heron et al. 1991). Soot, or smudging (Halley 1983:9) was identified as a powdery blackened or fireclouded area covering a portion or all of a sherd's surfaces. Charred organic matter was recognized as an encrustation on the sherd surface(s). Under low magnification, these deposits "appear as a distinct surface layer with a lustrous, finely cracked or checked surface" (Halley 1983:8) which could be removed for analysis (Deal et al. 1991). Inorganic matter was identified as a mineral deposit visible on the sherd surface (e.g., a ring left around the interior vessel surface, caused by boiled water). Inorganic matter was not commonly identified. Residue analysis was recorded on a presence (1) or absence (2) basis. If a sample had been collected, but not yet submitted for analysis, the number two (2) was inserted in the data field.

Data from each vessel was recorded in "report form" on the dBase system in order to tabulate the requested information for analysis. The attributes which Petersen and Sanger (1991) most frequently used were also tabulated (Table 4.1) and the two were compared in the hopes of identifying correspondence between the ceramics of southwestern Nova Scotia and their general chronological model for Maine and the Maritime

Provinces.

Study Collections

The following discussion provides an overview of the study sample in terms of general and direct dates, both radiocarbon and thermoluminescent. In addition to the sites examined in this analysis, a literature search provided a number of additional dated and undated samples from which to draw comparisons. These sites are also discussed.

The terms general and direct association have been adopted from Petersen and Sanger (1991) and essentially can be defined as follows. A general date is one which was obtained in approximate but not immediate relation to the ceramic artifacts. A direct date is one that was obtained in conjunction with ceramic artifacts and is believed to represent the age of all artifacts in association. The thermoluminescent dates would obviously represent direct associations. General date associations are predictably approximate, and these vessels required additional supportive data in order to estimate the Ceramic Period with which they best fit.

Ceramics from all periods are represented for the study region (refer to Table 2.1), including cord impressed vessels from the Melanson and St. Croix sites which are believed to date to CP 1. Undated ceramics were placed into Ceramic Periods on the basis of relative dating methods. The attributes of each vessel were examined and compared to those outlined in Petersen and Sanger (1991). Many of the vessels were assigned to multiple Ceramic Periods due to the lack of associated dates.

The following section discusses each site used in this study. Research results of both the ceramic analyses and literature review are

outlined in terms of the chronological placement of each site and associated dates and vessels (Table 3.1).

1. Eel Weir VI (BbDh-6)

The study collection central to this project came from the Eel Weir site in Kejimkujik National Park, Nova Scotia. Eel Weir VI ceramics, at 92 vessels, comprised the largest of the documented collections. There were several radiocarbon dates in general and direct association with the ceramics, which were also used in conjunction with relatively dated vessels. Based on dated vessels alone the Eel Weir site spans Ceramic Periods 4-7. However, undated grit tempered, dentate and pseudo scallop shell decorated vessels indicate that the site was potentially occupied as early as CP 2 or CP 3.

Eel Weir consists of a complex of sites located along the banks of the Mersey River between George and Loon Lakes (Figure 3.6). It was first discovered during an archaeological survey conducted by Environment Canada, Parks (Myers 1972). During the 1972 survey none of the sites which comprise Eel Weir were extensively tested, although a sample of artifacts from each was obtained (Myers 1972:1). In 1973 Myers completed the survey, proceeding southward along the Mersey River and redefining the Eel Weir sites (Ferguson 1986:2). A proposed parking lot at the north end of Eel Weir was tested in 1979 but revealed only disturbed material, which students from St. Mary's University, Halifax, salvaged a year later (Ferguson 1986:2). The Eel Weir sites were re-surveyed in 1982 and excavations initiated at one site (9B11) were continued the following year (Ferguson 1986:3).

Table 3.1

Chronological Arrangement of Dated Samples from the Study Collection.

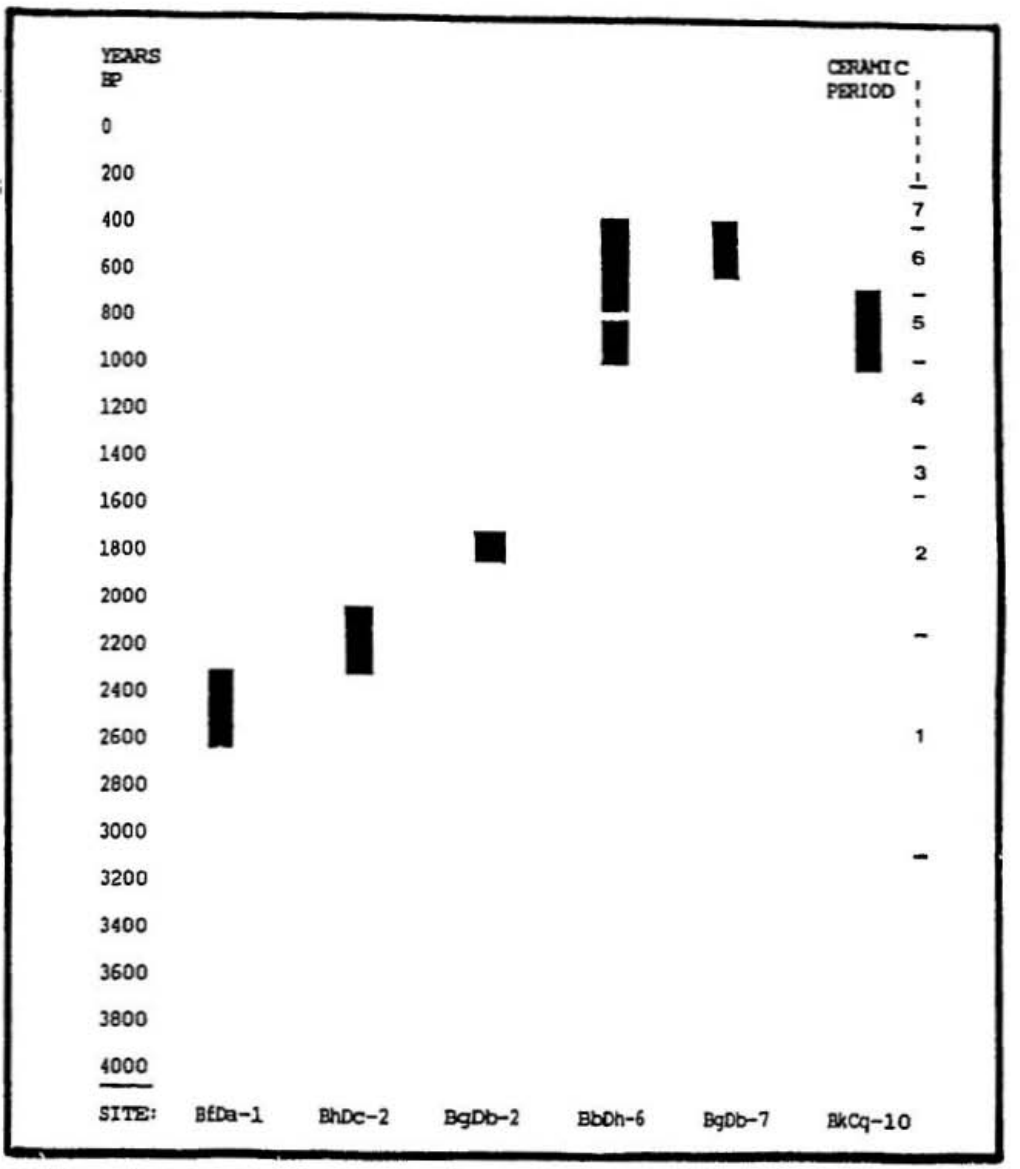
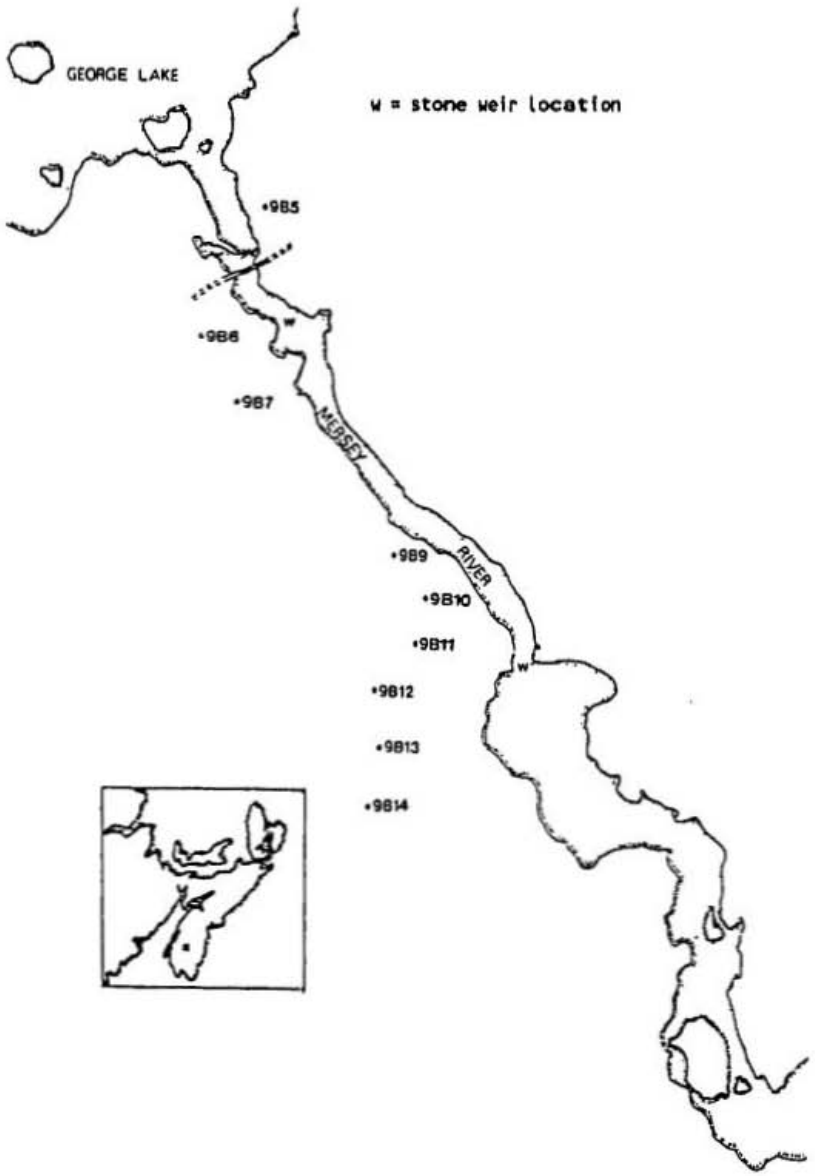


Figure 3.6

Map of Eel Weir Sites Along the Mersey River.



After Ferguson n.d.

A large proportion of the prehistoric sites in Kejimkujik National Park were found to occur along the Mersey River and the shores of Kejimkujik Lake. The Eel Weir area represents the greatest concentration of seasonal base camps and specialized activity areas in the Park (Ferguson 1986:11-12). Eel Weir is currently comprised of ten sites including those originally identified and later redefined by Myers (1972). Parks Canada designation for the sites covers 9B6 through 9B15, or Eel Weir I to X. Sites include components ranging from Maritime Archaic to Contact Period, although, based on artifact frequencies, it is believed that there was increased activity during the Middle to Late Ceramic Period (Ferguson 1986:11-12).

Local inhabitants consider "Eel Weir" to be the portion of land adjacent to the Mersey River as it flows from George Lake to Loon Lake. This area was used by the Micmac for setting traps or weirs (Myers 1972). According to Myers (1972), during the summer when the river was low, large stones were pushed into the river bed to form wide V shapes spanning the width of the river. During the fall migration of eels downstream the Indians lodged tree branches upright in the submerged walls. The fish and eels swimming into the weir would become trapped and easily caught with dip nets or baskets. On shore, the women killed, skinned and smoked the fish and eels to preserve them as a winter food supply. The use of these weirs likely persisted into the 20th century. There are at least three locations along the Eel Weir where these stone concentrations are visible. A large grassy field located near the final concentration of stone is thought to have housed a major Indian campsite (Myers 1972:57). The following discussion draws directly from observations prepared by Ferguson

(1986) for those sites occupied during the Ceramic Period.

Eel Weir I (9B6), dated to AD 200-1600, is the northernmost of the sites near George Lake. A number of coarse ceramic sherds with dentate and cord wrapped stick decoration was found at this site and they are believed to represent a Middle to Late Ceramic Period occupation. A stone weir associated with 9B15 but of unknown origin is located in the Mersey River below the site. According to Ferguson (1986:20-21) the presence of a weir supports the idea that the site may have been a fish processing area used by the occupants of 9B15.

Eel Weir II (9B7) is also dated to AD 200-1600, and is located about 100 meters south of 9B6, and 20 meters from the water. No ceramics were found at this site; however, based on the lithic assemblage it is thought to represent a Middle to Late Ceramic Period processing area related to 9B15 (Ferguson 1986:21-22).

Eel Weir IV (9B9) sits on a gentle slope by the Mersey River and is thought to represent a specialized activity site related to a base camp 200 meters to the south (9B11). Although a Middle to Late Ceramic Period date (AD 200-1600) was suggested by the lithics, no ceramics were recovered to provide comparisons (Ferguson 1986:23).

Eel Weir V (9B10) is located 60 meters north of the lowest stone weir and 9B11, on level ground adjacent to the river. The site dates from 2500 BC to AD 1900's, with prehistoric and historic artifacts. Evidence for Maritime Archaic and Woodland activity was present but there were no ceramics. This site may have been a small activity area associated with 9B11 (Ferguson 1986:24).

Eel Weir VI (9B11) is the largest of the Eel Weir sites and dates

from ca. 2500 BC to the 1900's AD. It is located approximately 800 meters south of George Lake where the Mersey River crosses rapids into a large bay. Located near a stone weir immersed in shallow rapids, the site contains two potential housepits, hearths, and a number of small pits and artifacts from all occupation periods represented in the Park. It is believed that this was a major base camp for a number of household units during the fall and winter. The lithics indicate that the occupation extended from the Maritime Archaic to the recent historic period and also includes evidence for the Susquehanna tradition (see Tuck 1984). Ceramics from this site were described as Early Ceramic Period due to their thin walls, dentate and/or pseudo scallop shell decoration and the appearance of being well fired. However, most of the artifacts date from the Middle to Late Ceramic Period. This became particularly clear in the observed proliferation of coarse ceramic sherds, often having cord wrapped stick decoration. One such vessel was associated with a radiocarbon date of 830+/-190 BP. A housepit hearth was radiocarbon dated to AD 1040+/-80 and AD 1520+/-50, placing it in the Late Ceramic Period. Trade beads and a gunflint comprised the assemblage of contact period artifacts. First tested and recorded by Myers (1972), this site is believed to contain the most extensive cultural deposit in the Park.

Further testing took place at Eel Weir in 1973 and resumed again two years later. In 1982 extensive testing and preliminary excavation of one pit house structure was conducted. Ferguson (1986) continued the excavations, completing one housepit and testing a second. Seven radiocarbon samples from the two years' excavations all corresponded to the Middle to Late Ceramic Period, the oldest being AD 1040+/-80 (Ferguson

1986:25-28). Both faunal and paleobotanical material have been recovered from the Eel Weir VI site. In 1984 a sample of 52 faunal specimens from the Eel Weir site was analyzed (Stewart 1984). The sample was composed primarily of small, highly calcined bone, the diagnostic features of which had been obscured by burning. Domestic cow was the only identifiable species and clearly represented a more recent addition to the site. Including information from a larger faunal sample of 176 specimens from Eel Weir analyzed by Cumbaa in 1982, Stewart reported the identification of beaver, and a mammal fragment which may have been worked. All of the remaining specimens were identified to *Class Mammalia* or as Class uncertain (Stewart 1984).

Charred seed remains recovered from hearth features at Eel Weir revealed a large percentage of blackberry and raspberry seeds followed in frequency by docks and sorrels. Other plant species included oak, strawberry, cherry, and jack-in-the-pulpit. All of the identified species were, and are still available in the the summer and/or late fall at Eel Weir (Bates and Marshall 1990).

Eel Weir VII (9B12) dates from 700 BC to AD 1600. Located at the west end of 9B11, the site is thought to represent a specialized activity area possibly associated with the campsite below 9B11. Suggested functions for the site include use as a ritual area for members of the larger camp (9B11), or perhaps as a temporary retreat from periodic spring flooding. Ceramics and lithics from the site support a Middle to Late Ceramic Period occupation, while the lithics also indicate an Early Ceramic Period occupation (Ferguson 1986:29).

Eel Weir VIII (9B13), dating from AD 200 to 1600, is a small site

located 80 meters from the broad bay in the Mersey River and 130 meters south of 9B11. Myers recovered three pieces of Middle to Late Ceramic Period ceramics and some lithics from this site. The small sample retrieved may be traced to an occupation on the terrace above (9B14) (Ferguson 1986:30).

Eel Weir IX (9B14) is the southernmost of the Eel Weir sites situated directly above 9B13 and dating to 700 BC-AD 1600. A large sample of well-made thin ceramics with fine dentate and pseudo scallop shell decoration, as well as some thicker coarse ceramics was recovered (Myers 1972). The lithics and ceramics suggest a strong Early Ceramic Period occupation, although it was visited in the Late Ceramic Period as well. The site is situated 110 meters away from the water's edge and its function is ambiguous. A seasonal habitation site is suggested by the frequency of ceramic sherds. The occupation may have been limited to one or two households, possibly from the main campsite (9B11), as the deposit is thin (Ferguson 1986:31).

Eel Weir X (9B15) dates from ca. 2500 BC to AD 1900's and is the only Eel Weir site located on the east bank of the Mersey River. Situated where the Mersey River drains out of George Lake, the site is positioned beside two stone weirs of unknown date. The lithics and coarse ceramics here indicate a long and continuous occupation as a seasonal base camp from the Maritime Archaic through the Late Ceramic Period (Ferguson 1986:32-33).

The Eel Weir ceramics were tentatively organized into decorative types (Ferguson n.d.) while sherds containing shell temper were isolated and discussed as a separate category. Dentate, oblique dentate, pseudo

scallop shell, linear stamp, incised, trailed, punctate and cord wrapped stick were the design elements which were combined to formulate 19 decorative types. In addition to decorative elements, vessel morphology, temper type and grade, tool type, technique of application, metric attributes of both design elements and vessel anatomy, method of manufacture, location of decoration, provenience and chronological positioning were all described. These types were not employed in this research project other than as possible indicators of vessel lots.

Eel Weir Ceramics

The first radiocarbon date of 910 +/- 80 BP, possibly associated with Vessel 3, fell under the category of general association. This date placed the vessel in CP 4-5 which was not entirely compatible with the attributes listed for these periods (Table 4.2). The vessel had fine grit temper, an everted rim and flat lip. Decoration was dentate, simple stamped on the exterior rim and body, possibly indicating an earlier time allotment for this vessel. Vessel 4 was given the same temporal designation, but this was not a direct association and since the vessel was of medium grit temper and bore a simple stamped dentate decoration on the exterior body, it would seem to belong in an earlier period (e.g. CP 2 or 3).

Vessel 15 was directly associated with two dates and in general or possible association with a third. Dates of AD 1120 +/- 190 (direct association), 830 +/- 190 BP (direct association), and 910 +/- 80 BP (general association) place the vessel in the CP 4-6 date range. The vessel was coil constructed, of medium grit temper, with a mouth diameter

of 24 centimeters and a vessel height of 14 centimeters. It had a direct rim, rounded lip with notched motif, ovaloid body (refer to Figure 3.4), rounded base and was decorated with a cord wrapped stick of Z twist. The cord wrapped stick decoration was rocked and not simple stamped, yet this seems to be a minor variation among CP 4 vessel attributes.

Vessel 24 was directly associated with a date of 680 +/- 90 BP obtained from a feature placing the vessel in the CP 5-6 date range. The vessel contained coarse grit temper and had a rocker stamped dentate design on the body exterior. This vessel did not correspond with the attributes diagnostic of Ceramic Periods 5-6, as the date suggests. The associated attributes indicate correspondence with CP 2 or 3.

Vessel 56 was in direct association with a date of AD 1480 +/- 60 (420-540 BP) placing it in CP 6. The vessel was tempered with organic/shell matter. This vessel had a rounded lip, was of coil construction and decorated with a simple stamped, cord wrapped stick.

Vessel 60 was in direct association with dates of 430 +/- 50 BP, and AD 1520 +/- 50. This vessel was tempered with both organic and grit (medium) material. The lip was braced or rolled to the exterior. The vessel was of coil manufacture and left undecorated. The date places the vessel in CP 6-7, and based on the date and decoration, it probably belongs in CP 7.

Vessel 66 was in direct association with a date of AD 1520+/- 50, while the date of AD 1040 +/- 80 probably resulted from a disturbed context (Ferguson 1982). These dates place the vessel in the CP 4-7 date range. Using the direct date only places the vessel in CP 6. This vessel was tempered with coarse grit. The rim was everted, the outsloped lip

rounded and bearing dentate notches. The exterior rim was decorated with dentate, simple stamped, and lines drawn with a blunt stylus. The neck and body exterior also had simple stamped and rocked dentate decoration.

Vessel 83 was directly associated with a date of 670 +/- 140 BP, placing it in the CP 5-6 date range. The vessel was of medium grit temper and decorated with a cord wrapped stick, simple stamped on the body exterior. Based on these attributes, this vessel was estimated to belong in CP6.

2. Turnip Island (AkDm-1)

Although known locally as the Commeau Hill site, this shell midden is located on the south end of Turnip Island (Davis and Sanger 1991:71). The site was first identified by Erskine and later recorded and surface collected by Davis during survey investigations (1991:71). One almost completely restored vessel recovered from the site by Mr. Wilbur Sollows is currently on display in the Yarmouth County Museum. Although not a part of the study collection, information regarding the vessel was accessible through documentation (Davis 1974).

The grit tempered vessel was decorated with a cord wrapped stick and punctates. The vessel had an estimated capacity of six quarts and a mouth diameter of 17.5 centimeters. The incomplete base seems to indicate a globular shape (Davis 1974:4-5). Based on these attributes, this vessel could belong to CP 5, 6, or 7.

3. Melanson Site (BgDb-2/BgDb-3/BgDb-4/BgDb-5/BgDb-7)

The initial analysis of ceramics from the Melanson site, in the Gaspereau valley, included 1018 sherds which were reduced to 53 vessels (Kristmanson 1990:111). This assemblage was re-examined and some adjustments were made.

The dates returned for this site placed it in CP 2, and CP 5-6. The first date, 1760 +/- 60 BP (Beta-17908) was a general association (BgDb-2-4) which dated to CP 2 and was loosely associated with both pseudo scallop shell, cord wrapped stick and dentate decorated vessels. The vessels were of thin and thick walls respectively. The predominant temper type was grit, but there were some specimens with organic as well as shell temper. Decoration is on the lip, rim and body exterior. Lips were flat and rounded, while rims were direct and everted.

A date of 730 +/- 20% BP (Alpha-3157), in general association (BgDb-5) with rocked and simple stamped ceramics, placed some of the sherds in CP 5; information regarding the sherds submitted for thermoluminescent dating was unavailable. Vessels were also decorated with punctates, notched lips, incision, pseudo scallop shell, and one sherd was fabric impressed. All were grit tempered, and the grit was generally very coarse. Decoration was on the interior and exterior rims, the lip, and body exterior. Vessels had predominantly round lips and everted rims.

The dates of 790 +/- 60 BP (Beta-17909), 560 +/- 60 BP (Beta-17910), and 500 +/- 20 % BP (Alpha-3158) fit in the CP 5/6 range. These dates are in general association with simple stamped, cord wrapped stick decorated vessels. Temper was organic/shell and decoration was located on the exterior lip, rim and body. Vessels had flat or rounded lips, but rim

profiles are unknown.

In addition to excavated material, three collections of ceramics from the Melanson area were borrowed from private collectors Mr. J.S. Legge (JSL), Mr. E.F. Gertridge (EFG) and Mrs. M.E. Hirtle (MEH) for cataloguing and analysis. Since all of the sherds were surface collected they did not contribute significantly to the overall chronological assessment. The ceramics from these collections were analyzed and documented in the dBase program and, where possible, were assigned to Ceramic Periods based on attribute correspondence.

The three collections were reduced to 66 vessel lots (i.e., nine in the JSL collection, 51 in the EFG collection and six in MEH collection), which suggest a CP 3 through CP 7 occupation span for each site. These chronological allotments are merely estimates based on the similarity of attribute clusters with the model outlined by Petersen and Sanger (1991). The three collections contained ceramics of dentate and cord wrapped stick decoration. Pseudo scallop shell decoration was found only in the Gertridge collection. Chronological designation for the majority of these vessels was restricted to multiple ceramic periods.

4. St. Croix Site (BfDa-1)

Located in southwestern Nova Scotia near the Minas Basin, this site produced a collection of 33 inferred vessels (Deal and Butt 1992). One of the latter was found in direct association with a hearth feature which has been dated to 2500 +/- 120 BP (Beta-49256). Two more vessels were generally associated with the radiocarbon date.

Sherds from Vessel 18, a grit tempered vessel with a flat lip and

direct rim profile were recovered directly from the feature, thus placing the vessel in CP 1. The vessel is decorated with oblique linear dentate impressions, simple stamped on the lip, rim and body.

Vessels 21 and 31 were not removed from the hearth feature; however, their fabric impressed interior and exterior surfaces and grit temper correspond with CP 1 attributes and radiocarbon date. Vessel 33 exhibited pseudo scallop shell decoration, simple stamped on the exterior rim and body. Its stratigraphic position placed it in general association with the radiocarbon date. The vessel had a fine grit temper, along with an outsloping lip and a direct rim.

Vessels 18 and 33 do not conclusively belong to CP 1 regardless of the radiocarbon date. The attributes of these vessels point toward CP 2 and CP 3; however, the radiocarbon date taken in conjunction with Vessel 21 indicates an occupation as early as CP 1 at the St. Croix site.

5. Tusket Falls (A1D1-1)

Located near Yarmouth, Nova Scotia, the Tusket Falls site was dug by Erskine (n.d.). Sherds examined from this site were reduced to three vessel lots. The first was assigned to CP 3 based on its grit temper and dentate decoration. The other two were assigned to CP 4-7 since they were shell tempered and cord wrapped stick (twist direction undetermined) decorated.

6. Clam Cove Site (BhDc-5)

The Clam Cove site is located on the western shore of Cape Split, between the Bay of Fundy and the Minas Basin (Hiseler and Linehan n.d.).

Although only two vessels were recovered, one which was found in association with charcoal has been dated to 2170 +/- 140 BP (Beta-49257) or CP 3. The vessel was grit tempered and decorated with rocker dentate. The lip was decorated with a straight edged tool. The vessel had an everted rim and a rounded lip. These attributes are compatible with those suggested for Ceramic Period 3.

7. Bear River (BdDk-1)

This site is located on the east side of Smith's Cove in the Annapolis Basin. The site was first discovered and explored by John Erskine in 1957 and later excavated by Stephen Davis in 1975 (Connolly 1977; Davis 1986).

Some of the Bear River site ceramics have been assigned to a general association radiocarbon date of 2125 +/- 65 BP (Petersen and Sanger 1991:131; Wilmeth 1978:154; MacIntyre 1983:38). This date was obtained from a charcoal sample found in association with sherds retrieved "at a depth of 15 in., in the upper third of lower ("lower Bear River") level" (Wilmeth 1978:154). Due to large sample size and the absence of information regarding the location of the charcoal sample taken for dating, and without the description of associated materials, it is impossible to directly associate any ceramics with this date. However, this date corresponds with CP 2, and the assemblage does contain ceramics of the proper description for this period, thus lending support to the validity of the date. This analysis found that ten of 71 vessels belonged to Ceramic Periods 2 (i.e. vessels 25 and 27), and 3 (i.e. vessels 8, 22, 26, 29, 52, 59, 65, 67; See Table 2.1 and Appendix A).

8. Port Mouton I (AlDf-1)/Port Mouton IV (AlDf-3)

This site is located in Port Mouton Harbor, Queens County. It was excavated in 1966 by John Erskine and has been described as a "stratified site, with late Upper Bear River [Late Archaic] culture stratigraphically below thinner Indian Gardens [Late Ceramic Period] deposit" (Wilmeth 1978:155). A charcoal sample submitted for radiocarbon dating produced a date of 2640 +/- 70 BP (GaK-1271; NMC-155), or CP 2, which Erskine believed to be too early for the Ceramic Period component of the site (Wilmeth 1978:155). This date, however, could be acceptable for the site given the presence of dentate ceramics which could date as early as CP 2. Cross-mends between sherds from these two sites (see Vessel 3, AlDf-3) suggests that they could be considered a single occupation. The sherds in the AlDf-1 collection were grouped into 14 vessels which were then assigned to Ceramic Periods 3 and 4-7. Seven of these vessels were grit tempered and dentate decorated, while two were decorated with a cord wrapped stick and also grit tempered. The remainder were decorated with a straight edge tool and/or punctates in conjunction with dentate stamp.

The sherds in the AlDf-3 collection combined to produce 16 vessels also dating to Ceramic Periods 3 and 4-7. Decorative forms included dentate stamp, straight edge tool impressions, and punctates, all on grit tempered sherds, for the CP 3 vessels. Vessel 10 is the exception with organic and grit tempering. The CP 4-7 dated ceramics included those of grit tempered, cord wrapped stick decorated vessels.

9. Port Joli XII (AlDf-2)

Located on Scotch Point in Port Joli Harbor, the Port Joli site was

excavated and divided into sub-sites based on interior versus shoreline location (Erskine 1958). Port Joli XII, produced a collection of five vessels which corresponded with the CP 4-6 date range. The vessels were of cord wrapped stick decoration, or undecorated. One vessel also had punctates and organic tempering. One other vessel was tempered with organic matter, and the remaining three were grit tempered.

10. Bain Site

Located on the Chegoggin River, Yarmouth County, the Bain site produced three radiocarbon dates from "feature-associated charcoal recovered in 1988" (Davis and Sanger 1991:184). Two of these dates were in direct association with ceramic material, placing them in the CP 1-2 range with dates of 2000+/-80 BP (Beta-28027) and 2030 +/- 80 BP (Beta-28029). The radiocarbon dated samples were directly associated with a hearth, two rim sherds and a body sherd of grit temper and dentate decoration (Davis and Sanger 1991:184).

11. Brown Site (BeCs-3)

In 1985, excavations at the Brown site on the central Atlantic coast recovered a sample of 1033 ceramic sherds that were reduced to 51 vessel lots (Sheldon 1988:37,95). Vessel 19, found in a hearth feature, is assigned to early CP 4 based on a direct association with a date of 1230 +/- 70 BP (Beta-14052). The vessel has organic and/or shell temper, a vertical rim with parallel sides, a flat lip and an average wall thickness of 6 mm. The decoration includes simple stamped cord wrapped stick, and dragged/ simple stamped, cord wrapped stick (Sheldon 1988:89).

12. Cellar Cove (BdCx-1)

Located on the Atlantic coast on the northeast side of St. Margaret's Bay, this site was first explored by Erskine in 1960 and professionally excavated by Davis in 1977 (Davis 1986:110). The ceramics included dentate, cord wrapped stick and undecorated sherds. The dentate decorated vessels (simple and/or rocker stamped) were grit tempered, and also decorated with punctates and/or trailing. Trailing, occasionally used as the sole decoration, was also combined with incision and cord wrapped stick decoration (MacIntyre 1983:47). The cord wrapped stick decorated vessels were predominantly grit tempered. Occasionally, the cord wrapped stick was simple stamped on the vessel interior. Of the 12 vessels with castellated rims, only 5 were from this decorative group. The remainder were associated with punctates and/or trailing as the sole decorative treatment (MacIntyre 1983:48).

A number of dentate and cord wrapped stick decorated vessels exhibited interior combing (MacIntyre 1983:47). Although combing was found to be present on vessels of external cord wrapped stick decoration, none of the dentate decorated vessels examined in this project exhibited combed interiors. This type of interior finish or decoration was, however, occasionally present in the rest of the Maine-Maritimes region during CP 2 (Petersen and Sanger 1991:131). Information from this site suggests that these ceramics date from CP 2 or 3 and at least into CP 4.

13. Rafter Lake (BeCx-3)

This site is located on an interior lake system which drains into St. Margaret's Bay and was excavated in 1977 (Davis 1986). The site yielded a single Vinette-like sherd with vertical cord impressions on the exterior and horizontal cord impressions on the interior (Davis 1986:119-121). This sherd was found in a hearth with a stemmed biface of Meadowood style, which indicates a date of CP 1. The ceramics from this site were also examined by MacIntyre, who indicated that they were decorated predominantly with the dentate stamp (MacIntyre 1983:37). There were no vessels of cord wrapped stick decoration, which seems to support an early date (Macintyre 1983:34). Furthermore, MacIntyre found correspondence with vessels from the Middle Period Oxbow Site which dates to 2200-1600 BP (Allen 1981), or CP 2/3. Given the above attributes, in addition to punctations and rounded lips, the Rafter Lake site dates from as early as CP 1 through CP 3.

14. Landing Site (BfDd-14)

One Vinette-like sherd, 1.1 centimeter thick, was surface collected at the Landing site on Gaspereau Lake near Wolfville (Deal 1992: personal communication).

Sites External to the Study region

Although located outside the study region, the Delorey Island and Cox-Swanson sites have been included as their dated ceramics provide valuable chronological information relevant to this research.

Delorey Island (BjCj-9)

Located in eastern Nova Scotia in St. George's Bay, this site produced a small ceramic sample of 354 sherds. However, this material provided useful information regarding the applicability of Petersen and Sanger's model to other parts of Nova Scotia.

Based on a direct association of one sherd with a date of 460 +/-20% BP (Alpha-544; Nash and Stewart 1986:25), this vessel fits into CP 6. The sherd was recovered from Level 3 (i.e., the lowest of the occupation levels in Area 1) and was decorated with a cord wrapped stick, grit tempered and 1 centimeter thick. This sample was dated using the thermoluminesence technique (Nash and Stewart 1986:25).

Cox-Swanson (BkCq-10)

Located on the Northumberland Strait near Pictou, Nova Scotia, this Late prehistoric shell midden site was excavated by Keenlyside (1980). Based on radiocarbon dates of 840 +/- 60 BP (Petersen and Sanger 1991:168), and 700+/-45 BP (Keenlyside, pers. comm.), the ceramics from the site could be assigned to Ceramic Period 5 . This attribute analysis indicated that three of the five vessels could be broadly assigned to Ceramic Periods 4-7. Two of these vessels were of Z twisted cord wrapped stick decoration. The other was a cord wrapped stick decoration of undetermined twist.

The lip of Vessel 4 had been impressed with an alternating notched tool which produced a pseudo scallop shell decoration. The remainder of the vessel surface had been left undecorated. Based on these attributes, the vessel was tentatively assigned to CP 2-3, the only periods described

with this decoration. Temper type indicates the vessel may be more precisely assigned to late CP 2 or early CP 3. All the vessels except one of those decorated with cord wrapped stick (Vessel 5) contained organic temper. Vessel 5 was tempered with grit.

CHAPTER 4

THE PETERSEN/SANGER MODEL REVISITED.

A specific goal of this research was to evaluate the model proposed by Petersen and Sanger, and to discover through ceramic analysis whether Nova Scotian ceramics could be readily incorporated into their model. Performing an attribute analysis on the Eel Weir ceramics and a number of comparative collections served to enhance the current body of knowledge regarding Nova Scotian ceramics, and demonstrated that the ceramics were generally compatible with Petersen and Sanger's model (1991). The following discussion presents this chronological concordance in more detail and also addresses a number of related questions which had arisen during the process of analysis.

Chronological Comparison

Generally, the dates in direct association with ceramics correspond with the chronological model posed by Petersen and Sanger (1991). This information suggests that the model is appropriate for application to ceramic material from sites in southwestern Nova Scotia. Some sites, however contained ceramics which, despite associated radiocarbon dates, do not directly correspond with Petersen and Sangers' model (Table 4.1).

Radiocarbon and thermoluminescent dates from the Melanson site were only generally associated with ceramic material, thus precluding direct comparison with the chronological model. Reference to the dates and ceramic attributes indicates that the collection includes vessels ranging

from CP 1 through CP 6 although it is impossible to associate specific vessels with dates.

Although the radiocarbon date of 2500 +/- 120 BP (Beta-49256) was not found in direct association with the expected vessel attributes for CP 1 at the St. Croix site, the presence of the Vinette-like sherds in the collection suggests that the date is acceptable. Since the model has generally proven to correspond with the ceramics in the study collection, this radiocarbon date will be interpreted as corresponding to the fabric impressed vessel rather than to the dentate decorated vessel with which it was directly associated.

Slightly more than half of the dated associations from the Eel Weir collection corresponded with Petersen and Sanger's chronology. The general association of 910 +/- 80 BP with Vessels 3 and 4 may be acceptable if the dentate stamp decoration persisted into late CP 4 and/or early CP 5 in the study area. Evidence for this extended use of dentate stamp is also provided by Vessel 24, which was directly associated with a date of 680 +/-90 BP, and Vessel 66, which was directly associated with a date of AD 1520 +/- 50, and in general association with a date of AD 1040 +/- 80. Both of these vessels were grit tempered and dentate decorated. It appears as though the dentate stamp potentially dates as recently as CP 5-6 based on the Eel Weir sample. Vessel 15, also dating in the CP 4-6 range, was directly associated with dates of AD 1120 +/- 190 and 830 +/- 190 BP, and generally associated with a date of 910 +/- 80 BP. This vessel was decorated with a cord wrapped stick, and grit tempered in accordance with attributes for the CP 4-6 date range.

The remaining vessels (56, 60 and 83) were in direct association

with radiocarbon dates and corresponded with the attributes outlined for Ceramic Periods 5-7. Therefore, the vessels from Eel Weir generally corresponded with the chronological model and indicate that dentate decoration may have persisted longer in the Eel Weir portion of the study area than expected.

The general association of the dates from the Bear River and Port Mouton I and IV sites with vessels is of little help in evaluating the applicability of the model. As mentioned above, the presence of CP 2-like sherds in the assemblages indicates a potential, but inconclusive association with the radiocabon dates.

As Petersen and Sanger previously demonstrated, the ceramics from

Table 4.1

Ceramic Periods and Dated Vessels.

CP	RECORD #	SITE NO	C-14DATE
1	-	-	-
2	7	BgDb-2	1760+/-60 BP
3	8	BgDb-2	1760+/-60 BP
4	168	BbDh-6	910+/-80 BP
	169	BbDh-6	910+/-80 BP
	180	BbDh-6	AD 1120+/-190
5	189	BbDh-6	680+/-90 BP
	248	BbDh-6	670+/-140 BP
6	55	BgDb-7	560+/-60 BP
	57	BgDb-7	500+/-20% BP
	59	BgDb-7	560+/-60 BP
	60	BgDb-7	560+/-60 BP
	221	BbDh-6	AD 1480+/-60
	225	BbDh-6	430+/-50 BP
	231	BbDh-6	AD 1520+/-50
7	-	-	-

the Bain, Brown, Bear River and Cox-Swanson sites, and a portion of the Eel Weir collection corresponded with their chronological model (Petersen and Sanger 1991: Appendix 7.1). Further research into sites not included or completely examined in Petersen and Sanger's research may verify whether, as the Delorey Island site ceramics seem to indicate, the model applies to sites located outside the study region.

Fabric-Impressed Vessels.

Petersen and Sanger noted it had been "specifically suggested that the CP 1 fabric paddled, undecorated ceramics did not make many, if any inroads into portions of Maine and much of the Maritimes" although there is evidence to "support that it was more widely distributed than previously suspected" (1991:125-126). The presence of a fabric impressed vessel in general association with a date of 2500 +/- 120 BP (Beta-49256) at the St. Croix site, and undated fabric impressed vessels from the Melanson, Rafter Lake and Landing sites suggest that the distribution of fabric impressed vessels may be wider than expected.

Drag Stamping.

Drag stamping, as suggested by Petersen and Sanger (1992:126), does not appear to have been a frequent decorative application technique in southwestern Nova Scotia. None of the vessels in the study sample bore this form of stamp.

Vessel Thickness in Ceramic Period 3.

Petersen and Sanger suggested that although few "dramatic changes in

the nature of ceramic manufacture occurred between Ceramic periods 2 and 3" (1991:130), the most notable changes included an increased thickness in vessel walls in the rim area and perhaps the entire body (1991:130). In order to discern whether this phenomenon applied to the study sample, the lip, rim, and wall thicknesses of all the vessels from Ceramic Periods 1,2 and 3 were compared. The vessels were initially divided on the basis of the three decoration types: fabric impressed, pseudo scallop shell, and dentate stamp, which broadly correspond with Ceramic Periods 1,2 and 3 respectively. Since pseudo scallop shell decoration was considered to be diagnostic of Ceramic Period 2, and dentate decoration diagnostic of Ceramic Period 3 (Petersen and Sanger 1992:130), unless a date confirmed otherwise they were documented and treated as representatives of these temporal periods.

Where duplicate records occurred they were factored out so that each vessel was only represented once. The cause for duplicate records lay in the file structure of the dBase program used to initially record the data. For instance, as an attribute, "decoration" was further subdivided into categories or "fields" based on the zone on which the decoration appeared on the vessel. Should a vessel be represented by more than one type of sherd (e.g., body, rim and base), and should the decoration appear on all sherd types, then the vessel would mistakenly recur repeatedly when broad statistical information was drawn from the dBase program. To avoid over- or under representation, the duplicates were identified and eliminated prior to any tabulation. Dentate decorated vessels far outnumber the others, which may simply reflect a widespread use of ceramic vessels dating to this period. Although the trend noted by Petersen and Sanger

(the thickening of CP 3 vessels) seems to exist in the study collection, the discrepant sample sizes must be recognized. Table 4.2 lists the measurement tabulations. It is clear that, despite sample size, lip, rim and wall thicknesses seem to increase between CP 2 and CP 3. However, the fabric impressed sample indicates that the earliest vessels were the thickest of all. This conclusion is weakly based on the assessment of only three vessels, one of which was very thick at 14mm, and the others fairly thin at 7mm.

Table 4.2

Temporal Significance of Metric Attributes.

mm/ave. CP	DECORATION	LIP	RIM	WALL	#VESSELS/Sample Size
1	FABRIC	0	0	9.3	4
2	PSS	3	6	7.2	10
3	DENTATE	6.2	8.3	8.8	131

Although the sample sizes create certain limitations, the trend toward increasing wall thickness seems to be supported.

Rocked Dentate as the Preferred Decorative Application During Ceramic Period 3.

Another trend noted for Ceramic Period 3 was the shift to dentate as the dominant tool form, while rocker stamping became the preferred method of application (Petersen and Sanger 1991:130).

Again, dentate vessels were assigned to Ceramic Period 3 unless otherwise indicated by dated material. Dentate decorated vessels were drawn from the dBase files (i.e., lip, neck, shoulder, base, body

decoration) and multiple representations of the same record (i.e., vessel) eliminated.

Reference to Table 4.3 illustrates the proportion of dentate decorated vessels in the study sample which exhibited the rocked form of application.

Table 4.3

Frequency of Rocked Dentate in Ceramic Period 3.

	NUMBER OF VESSELS		
SITE	ROCKED	SIMPLE	% ROCKED
BgDb-5	9	8	52
BgDb-4	2	3	40
BgDb-3	0	1	0
BfDa-1	3	12	20
JSL	1	2	33
EFG	6	16	27
BbDh-6	7	26	21
BdDk-1	0	10	0
AlDf-1	1	9	10
AlDf-3	2	6	25
BhDc-5	1	0	100
TOTAL	32	93	

Clearly rocked dentate decoration does not characterize the majority of vessels and therefore the trend observed by Petersen and Sanger (1991:130) does not appear in this sample, nor do the rocked dentate vessels seem to be limited by geographical boundaries. Access to more precise dates would indicate whether rocker stamping was limited to a specific time period.

Spatial Significance of S and Z Twist.

Of specific interest in Petersen and Sangers' paper (1991) were certain statements regarding the S and Z twist of the cord wrapped stick design element. The authors indicated that the S twist technique was normally confined to the geographic interior while the Z twist technique was to be found mainly in the coastline sites of the Maine-Maritimes region. In order to evaluate this hypothesis for ceramics in southwestern Nova Scotia, care was taken to identify and record the twist of the cord with regard to each vessel on which it occurred. Replicative experiments (Kristmanson and Deal 1991) helped improve the identification of cordage twist. The procedure was further simplified by winding a string around a transparent ruler in order to gain a three dimensional perspective of what was appearing on the vessel surface. Also, by manufacturing cord wrapped stick tools with the use of dowels and string it was possible to recreate the S and Z twist on plasticine, which provided an exact representation of each technique. The latter procedure was particularly useful since it prevented misidentification of the twist due to reverse imaging of the twist on a vessel surface. Despite careful examination, only 11 vessels of S twist and 18 of Z twist were identified and recorded, while the twist was not recognizable on 99 vessels (Table 4.4). While a larger sample is preferable, the discussion which follows is based on the analysis of the available information.

Coastal sites clearly outnumber interior sites with regard to representation of vessels of identifiable cordage twist. The numbers may reflect a proliferation of the Z-twist cord wrapped stick, or it may reflect the analyst's ability to correctly identify the S twist. There

is, however, support for Petersen and Sangers' suggestion that the prehistoric potters occupying coastal sites favored the Z twisted cordage for their cord wrapped stick decorative tools. An obvious exception was

Table 4.4

Geographic Significance of S and Z Twist.

	# RECORDS		
SITE	S	Z	GEOGRAPHIC LOCATION
BdDk-1	1	10	coastal
AlDf-3	0	1	coastal
BkCq-10	0	2	coastal
BbDh-6	8	10	interior
AlDf-1	0	2	coastal
AlDf-2	1	3	coastal
BhDc-5	1	0	coastal
TOTAL	11	28	

the Eel Weir site (BbDh-6), which is an interior site and seems to have made nearly equal use of both the S and Z twist. It may be attributed to chance that Z twists occur at this site; however, this does not seem plausible given the fact that the Z twisted vessels actually outnumber those with S twists. It is suggested here, as a possible explanation, that the high number of Z twisted vessels may have temporal significance. This should be further explored with reference to any available dated material. The one dated vessel from Eel Weir is Vessel 15, a Z twisted vessel dated to AD 1120+/-190, or CP 4-5. Unfortunately, this was the only dated vessel of known cordage twist in the sample. This lack of knowledge regarding dated vessels precluded any explanation of incongruent cordage twist in terms of temporal significance. It is important to note that this apparent discrepancy appears to correlate with a point raised by Petersen and Sanger, that is, that this "typical" pattern of coastal sites

linked with Z twist (along with shell temper) was "apparently different between southern Nova Scotia at the eastern margin of the Gulf of Maine and northern Nova Scotia and New Brunswick during CP 5" (1991:145-146). Although Vessel 15 from the Eel Weir site dates to this period, and was decorated with a Z twisted cord wrapped stick, it was grit tempered, and Eel Weir is not a coastal site. From this information it must be concluded that this vessel at least is not compatible with the suggested pattern. It does, however, indicate that the proposed difference between southern and northern Nova Scotia may be further complicated by a difference between interior and coastal site ceramics. Unfortunately, no relevant information from sites in the northern region of the province is present in the working sample to verify this suggested pattern.

Another question arising from Petersen and Sangers' paper is whether or not shell temper was for the most part associated with Z twisted cordage, whether at coastal or interior locations, during CP 5 (1991:146). Again, with limited dates it was difficult to assess the situation for southwestern Nova Scotia. Without the aid of an associated date the primary problem was that it is virtually impossible to assign any vessel of cord wrapped stick decoration to one particular ceramic period. Vessels were invariably lumped into at least two or more periods as a precaution against misidentification. With only Vessel 15 from Eel Weir to refer to, it would appear as though shell temper is not always associated with Z twist vessels. Assuming that all of the vessels of Z twist date to CP 5 or thereabouts, calculations indicate that shell temper was nearly always associated with Z twist, whether coastal or interior (Table 4.5).

Table 4.5

Relationship Between Temper Type, and S and Z Twist.

	# VESSELS	%CWS SAMPLE	TEMPER TYPE
Z TWIST	5	23	SHELL
	16	73	GRIT
	1	4	GRIT/SHELL
	22	100	
S TWIST	2	18	SHELL
	8	73	GRIT
	1	9	ORGANIC
	11	100	

Based on all Z twisted cord wrapped stick decorated vessels, it appears that shell temper is not always associated with the Z twist. But where shell temper does occur with Z twist, it is at coastal sites and not in the interior at all. The shell temper/Z twist combination comprised over 65% and up to 100% of the sample at the coastal sites where it occurred (i.e., 4 of 6 vessels from BdDk-1, and both vessels from BkCq-10). With the S twist, however, shell temper appeared in both interior and coastal sites. It is interesting to note that not only are shell tempered, Z twist vessels completely absent from Eel Weir, but that shell temper should appear in an S twisted vessel. This of course is probably coincidental, given that 16 cord wrapped stick vessels from Eel Weir could not be identified in terms of twist.

In general it seems that there is not enough evidence to support the idea that during CP 5 shell temper is almost exclusively associated with the Z twisted cord wrapped stick design. Furthermore, available data

suggest that grit temper was more prevalent, whether on vessels of S or Z twist. Shell and/or organic tempering seems to have been more common in Late Ceramic Period ceramics wherever they occurred in southwestern Nova Scotia (Table 4.6).

Table 4.6

Temporal Significance of Shell Temper.

	# VESSELS	CERAMIC PERIOD
SHELL TEMPER	3	2-3
	18	4-6
ORGANIC TEMPER	2	2-3
	9	4-6
TOTAL	32	

Petersen and Sanger noted that although "the available information is only suggestive rather than conclusive, it appears that somewhere between the south and north shores of Nova Scotia, the association switched to a more typical correlation of S twist...with shell temper in the ceramics of CP 5 and presumably later" (1992:145). Since in most cases, it is impossible to discuss vessels from CP 5 without including those from CP 4,6 and 7 this issue will not be further addressed. The above discussion outlines only attainable results from the available data.

Finding a consistent pattern for the S and Z twist has proven virtually impossible and does not seem to support Petersen and Sanger's idea of population differentiation between coastal and interior Nova Scotia. Although the evidence supports the idea that the Z twist is associated with coastal sites, the sample from the interior site at Eel

Weir suggests that, at this site at least, equal use was made of S and Z twisted cords and that it occurred primarily on grit tempered vessels. Further, extensive river and lake systems cross-cutting the province historically provided a route between the Atlantic Ocean and the Bay of Fundy (Davis 1986:87). This seems to support the idea of a homogeneous culture characterized by high mobility and a vast communication network, rather than one of isolated shoreline populations.

As mentioned above, the S and Z dichotomy is perhaps better understood as a temporal rather than geographic or cultural phenomenon. At the same time, the sample seems to suggest that Z twist was prevalent, typically associated with grit temper and appearing at both coastal and interior sites. These may be the distinguishing features between southwestern Nova Scotia and the rest of the Maine-Maritimes region and are therefore not compatible with Petersen and Sangers' "general hypothesis of widespread differentiation between coastal and interior areas" (1992:146).

Shell Temper: Spatial and Temporal Significance.

Petersen and Sanger suggest that in the Maine-Maritimes region, shell temper occurred in interior areas, appearing in CP4 and 5 (1991:145). In order to test the study area for this proposed shift of temper from grit to shell in CP 4-5, details were drawn from the dBase program and analysed. Again the problem of inability to assign more recent vessels to a single Ceramic Period is apparent. When the dBase program is requested to produce all vessels dating to CP 4, for instance, it will retrieve all of those singularly assigned to that period as well

as all those assigned to CP 4/5, CP 4/5/6 or CP 4/5/6/7. Unfortunately, this restriction suggests a return to the use of the traditional tripartite chronological system used in this region for so long. The data seem to suggest a slight increase in the use of shell as tempering material at some point during CP 4/5/6, approaching equal proportions with grit tempered vessels, which seems to demonstrate a slight decline. However the data further suggests that as time progressed, somewhere in the latter range of CP 5-7, the predominant choice for tempering material returned to grit. This not only seems to support Petersen and Sanger's proposed shift from grit to shell during CP 5, but also lends support to the proposed shift back to grit in the last two Ceramic Periods. Unfortunately it is not possible to assign vessels to chronological periods based on temper type alone. Table 4.7 lists the results calculated from the dBase program.

Table 4.7

Temporal Significance of Temper Type.

	# VESSELS			
CP	GRIT	SHELL	ORGANIC	ORGANIC/GRIT
1	3	0	0	0
2	14	1	0	0
2/3	0	0	1	0
3	132	3	1	0
4	9	0	0	0
4/5	19	1	0	0
4/5/6	13	12	6	1
4/5/6/7	55	0	0	3
TOTALS	245	17	2	4

Vessel Thickness in Ceramic Period 6.

Petersen and Sanger found that during CP 6, vessels in the Maine-

Maritimes region became "dramatically thinner, likely representing a 60% to 80% or more reduction in thickness" (1991:147). Interpreted as an expression of increased proficiency in ceramic technology, they further suggested that this trend may have been specific to Maine and not the Maritimes (1991:147).

The recurrent problem of isolating vessels to specific Ceramic Periods again hampered any attempts to arrive at definitive results; however the problem was addressed by selecting those vessels with specific Ceramic Period associations and also using vessels which were lumped into multiple periods. Vessels designated to CP 3 were based on earlier estimations made for dentate decorated vessels. CP 4-7 vessels often bore cord wrapped stick decoration and had no other features from which to discern a more precise date. Vessels of CP 4, 5, and 6 designation were examined individually and grouped (Table 4.8).

Combining data from CP 5 and CP 6 indicates that vessels became progressively thinner during this time span, but few are very thin, and these are predominantly from CP 6, with only one in CP 5. Three vessels came from Melanson (BgDb-7), two from Eel Weir (BbDh-6) and one from Cox-Swanson (BkCq-10). The latter dated to CP 5 or later, while the others dated to CP 6 or later. This does not seem to reflect a regional pattern, but does lend some support to Petersen and Sanger's contention that vessel walls thin around CP 5, and begin to thicken again during late CP 6 or early CP 7. Without a strong association between dates, vessels and Ceramic Periods it is difficult to state with certainty the exact timing

Table 4.8

Vessel Thickness in Ceramic Period 6.

	AVERAGE THICKNESS			
CP	LIP	RIM	WALL	MOUTH DIAMETER
1	0	0	9.3	0
2	4.0	6.3	7.4	0
3	6.2	8.3	8.8	19.6
4	8.5	8.6	9.7	20.1
5-7*	5.0	5.0	7.7	0
6-7*	6.3	6.2	8.4	0

** Vessels fit into this range; there is no overlap between vessels in Ceramic Periods 5-7 and 6-7.*

of this change in vessel thickness. It seems that the most refinement took place in the lip and rim areas, since they continued to be thin while walls returned to a more sturdy thickness following CP 6. Mouth diameter was calculated where possible, and these measurements indicate that between Ceramic Periods 3 and 4 diameters stayed virtually the same. The relationship between lip, rim and wall thickness, and mouth diameter, if any, is unknown. It is interesting to note that the thin walled vessels of CP 2 were followed by thick walled vessels during CP 3 and CP 4. These, in turn, were followed by vessels of reduced wall thickness in CP 5 which existed until another increase at some time during or after CP 6.

Interior Channelling.

Petersen and Sanger suggested that interior channelling was not common on vessels in the Maine-Maritimes region during CP 2. This statement has been evaluated with reference to the entire Ceramic Period for the study area, as well as addressing the specific issue of CP 2 dated

vessels. Interior channelling has been interpreted here as the striae or grooves which appear to have been "combed" onto the vessel surface using a serrated tool of some sort. Applying the tool in a random or non-patterned motion is referred to as scraping, while the formation of chevrons, or cross-hatches is referred to as combing (see Kristmanson and Deal 1991). It is of interest that Petersen and Sanger associated interior channelling with stamped decorations, while data compiled from this sample reveal that it occurs exclusively with cord wrapped stick decorated vessels (also see MacIntyre 1983:47).

Table 4.9 tabulates the frequency of interior channelling in the study sample. It indicates that overall, interior channelling was not a common feature of the ceramic decoration or finishing procedure, representing only 18% of the sample. However, it is necessary to break the sample down into more meaningful units, such as Ceramic Periods, in order to more accurately assess the data.

Table 4.9

Frequency of Interior Channelling.

SITE	#VESSELS	# CHANNELLED	% CHANNELLED
A1Dk-8	1	0	0
BkCq-10	5	0	0
BgDb-2	2	1	50
BgDb-4	18	8	83
BgDb-3	1	0	0
BgDb-5	26	2	8
BgDb-7	6	0	0
BfDa-1	33	2	6
JSL	9	2	22
EFG	51	15	29
MEH	6	3	50
A1D1-1	3	2	67
BhDc-5	2	0	0
BbDh-6	92	7	8
BdDk-1	71	18	25
A1Df-1	14	1	7
A1Df-2	5	3	60
A1Df-3	16	0	0
TOTAL	361	64	18

The above data demonstrate that interior channelling occurs only on vessels of cord wrapped stick decoration dating from Ceramic Periods 4 through 7. The anomalous date of CP 2/3 comes from the Melanson site (BgDb-2) and is probably an incorrect estimation, as the date is only a general association. Twelve out of the twenty sites represented in the sample contained vessels with interior channelling. It was impossible to demonstrate that channelling was a common feature of ceramic manufacture during a specific temporal period or geographic region. The pattern does, however, seem to be more of temporal than spatial significance, since the sites include both coastal and interior representatives. A larger sample of coastal sites would be required to establish a reliable spatial

pattern.

Vessels which dated to CP 2, vessels of stamped decorations, did not exhibit the interior channelling identified by Petersen and Sanger. They specifically suggested that CP 2 vessels, predominantly of stamped tool decoration, bore marks of interior channelling (1991:126). All CP 2 vessels in the study sample were smoothed either by hand, stone, shell, grass, wood, leather or some instrument, but none bore the striae associated with interior channelling.

Again, interior channelling has only been identified with vessels of cord wrapped stick exterior (and sometimes interior) decoration in this sample, and based on the physical attributes of the channels, it seems fairly obvious that the cord wrapped implement was used to produce the internal channelling (see Kristmanson and Deal 1991). It is not known whether internal channelling was a functional or decorative procedure, and it is interesting that the internal channelling only occurs with vessels of cord wrapped stick decoration in southwestern Nova Scotia. Considering dentate stamped vessels, which may or may not fit into CP 2, it can be seen that again there are no vessels with interior channelling, only various forms of smoothing. Therefore, Petersen and Sanger's contention that interior channelling was not common on vessels dating to CP 2 seems correct for southwestern Nova Scotia. Interior channelling was, however, a common feature of ceramic vessel interiors at some point during Ceramic Periods 4 through 7 in the study area. It is interesting to speculate on whether or not this reflects communication patterns between southwestern Nova Scotia, and adjacent areas.

CHAPTER 5

CONCLUSIONS

Over the past century, archaeological ceramic research in the Maine-Maritimes region has developed significantly from the exploratory activities characteristic of the mid- to late nineteenth century, to the modern analytic techniques employed today. The appearance of ceramic material in the archaeological literature has evolved from simple description to elaborate reports based on systems and techniques designed for research that includes multi-dimensional cultural analysis and chronology building. Accordingly, methodology has adapted to the changes as ceramic analysis became a more prominent line of archaeological research. For example, the "type" system was replaced by "attribute" analysis, and the three "Woodland Periods" were replaced by seven, more concise, "Ceramic Periods". This research illustrates the current status of ceramic analysis in the Northeast as developments in chronology building and the potential identification of diagnostic attributes related to cultural identification and interaction are made (e.g., Petersen and Sanger 1991).

Regional cultural chronologies, such as those based on ceramic sequences, require testing and modification in order to increase their validity and utility. Although Petersen and Sangers' model appears to be compatible with ceramics from other regions of Nova Scotia, further testing is necessary. In particular, the ceramics from Nova Scotia that were cited in their research were largely recovered from sites in the northern part of the province (1991). Sites such as Ben Francis in Indian Bay, the Whynacht Cove and Eisenhauer sites in Mahone Bay, Cox-Swanson on

the Northumberland Strait, and Indian Point in Cape Breton all exhibited attributes which corresponded with their Ceramic Periods (1991). The Delorey Island vessel, although not included in Petersen and Sanger's paper, also matched specific attributes from the model, and therefore reinforces this contention. Even if ceramics from all over Nova Scotia seem to be compatible with the model, a more detailed analysis of the assemblages may reveal subtle regional differences within the province.

Since the chronology for the Maine-Maritimes region was largely based on sites external to Nova Scotia, further research was required to either demonstrate regional differences or confirm the ceramic chronology currently suggested for this province. This study has demonstrated that the ceramics of southwestern Nova Scotia generally correspond with the chronological model put forth by Petersen and Sanger (1991). However, with the benefit of more precise information, including dates in direct association with ceramics, less obvious differences and similarities may surface. For instance, the Eel Weir ceramics indicate that the use of the dentate decorating tool may have persisted for perhaps centuries longer in southwestern Nova Scotia than in other parts of the Maine-Maritimes region. Additional information regarding ceramics from interior sites is needed for verification. In addition to continued excavation, analysis of assemblages already recovered from radiocarbon dated sites such as the Horne site located in the interior on the Shubenacadie River near Grand Lake (Davis 1986:87) would allow for elaboration of current knowledge.

Ceramic collections from southwestern Nova Scotia sites loaned by the Canadian Museum of Civilization and private collectors comprised a large portion of the study collection and provided sufficient information

to supplement the data gathered from the Eel Weir ceramics. Unfortunately, not all of the collections were from professionally excavated sites, and such ceramics provided little in the way of chronometric dates.

Apparent lack of evidence has fostered doubt as to the extent of early occupation in Southwestern Nova Scotia (Petersen and Sanger 1991:125-126). This early presence is, however, supported by the recovery of Vinette-like ceramics at the Melanson, St. Croix and Landing sites, and further strengthened by a radiocarbon date from the St.Croix site. This lends credibility to the "suspicion that it [Vinette] was more widely distributed than previously suspected" (Petersen and Sanger 1991:126).

Continued excavation of interior sites, and the collection of dated material is necessary to properly evaluate the S and Z cordage twist hypotheses forwarded by Petersen and Sanger, and to explain why interior sites such as Eel Weir produced nearly equal amounts of both twist types. Such information may also demonstrate if shell temper was associated with the Z twisted cordage, whether from coastal or interior locations, and if shell tempering occurred with the S twist in Ceramic Period 5.

This analysis seems to confirm that vessel wall thicknesses did increase during Ceramic Period 3, and that thinner vessels were made during Ceramic Period 6. However, more precisely dated information is needed to further substantiate these results. It has also been established that the general preference for rocker stamped decoration during Ceramic Period 3 in the Maine-Maritime region does not necessarily apply to southwestern Nova Scotia. One of the most striking differences between ceramics from southwestern Nova Scotia and the Maine-Maritimes

region in general is the fact that interior channelling occurs at different times and was produced with different decorative tools. The significance of this has yet to be revealed.

This research generated a number of questions which will require further attention as new collections are available for analysis. For instance, there were not enough basal reconstructions to determine whether the globular vessel form replaces the conoidal form in late CP 5-6 (Petersen and Sanger 1992:145). Although better preservation of ceramics would be helpful, the allotment of time to re-fit sherds is also required. When more dated material is available, the extent of proto-Iroquoian influence on Nova Scotian ceramics could be examined (Petersen and Sanger 1992:149). Petersen and Sanger stated that in most of the Maritimes, "incision decorated and collared ceramics were rare to non-existent during CP 6 and later" and this "likely reflects the distinctiveness of this area(s) during the late prehistoric period" (1992:157). Without the benefit of accurately dated material it is virtually impossible to challenge this statement despite the presence of ceramics of similar description. It would also be interesting to discover ceramic vessels dating to the Contact Period which exhibit European influence in terms of morphology, quantity, and/or function (Petersen and Sanger 1992:159).

Although the collections examined during this project provided sufficient information to evaluate the model, it is clear that new information is necessary to more thoroughly assess its applicability. In particular, more directly dated material is needed, as well as more materials from interior sites. The study area should also be extended to incorporate the rest of Nova Scotia. With this information, comparisons

could be made between collections from within and outside of the province. Continued excavations are imperative as is access to more private collections. Ideally, these ceramics would be entered into the dBase system devised for this project. The flexibility of the dBase structure is beneficial to such a task, and would permit continued analysis and expansion of conclusions drawn here.

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APPENDIX A

CODED ATTRIBUTE LIST FOR dBASE

Vessel Number: 1-n.

Site Number: Borden designation.

Excavation Unit: Alpha-numeric designation.

Excavation Level: Cultural and/or natural level designation; PZ=ploughzone.

Feature Association: 0=no data; 1-n=feature number; X=feature present, but not numbered.

Associated Ceramics (within feature): 0=no data; P=present; A=absent; 1-n=number of associated vessels.

Associated Lithics (within feature): 0=no data; P=present; A=absent; F=flakes only; 1-n=number of associated artifacts.

Associated Fauna: 0=no data; P=present; A=absent; 1-n=number of individual specimens.

Associated Flora: 0=no data; P=present; A=absent;1-n=number of individual specimens (charred only).

Radiocarbon Date: 0=no data; 1=charcoal sample available; Gn=general date association; Dn=direct date association (most recent, if more than one).

Sherd Count: 1-n=total number of sherds from vessel.

Rim Sherd Count: 0-n=total number of rim sherds from vessel.

Body Sherd Count: 0-n=total number of body sherds from vessel.

Base Sherd Count: 0-n=total number of base sherds from vessel.

Petrographic Test: 0=no data; 1=present; 2=absent.

Inclusions: 0=no data; 1=grit; 2=shell; 3=organic matter.

Inclusion Size: 0=no data; 1=fine (<1mm); 2=medium (1-3mm); 3=coarse

(>3mm).

Paste Color: 0=no data; Alphanumeric Munsell Color Code.

Hardness: 0=no data; 1=fingernail; 2=window glass; 3=blade of pocket knife.

Lip Thickness: 0=no data; .01-n=thickness in millimeters.

Rim Thickness: 0=no data; .01-n=thickness in millimeters.

Wall Thickness: 0=no data; .01-n=thickness in millimeters.

Mouth (Orifice) Diameter: 0=no data; 1.0-n=diameter in centimeters.

Vessel Height: 0=no data; 1.0-n=height in centimeters.

Rim Form: 0=no data; 1=direct; 2=everted; 3=inverted; 4=collared; 5=braced.

Lip Form: 0=no data; 1=flat (or squared); 2=rounded; 3=pointed; 4=wedged; 5=insloped; 6=outsloped; 7=L-shaped; 8=braced; 9=T-shaped.

Body Form: 0=no data; 1=elliptical; 2=hemishperical; 3=ovaloid; 4=spherical.

Base Form: 0=no data; 1=concoidal; 2=hemispherical; 3=flat.

Appendages: 0=no data; 1=handle; 2=effigy; 3=node.

Manufacture: 0=no data or undetermined; 1=coiled; 2=modelled or pinched.

Interior Finishing Tool\Application: 0=no data or undtermined; 1=hand; 2=leather or wood; 3=grass or twig; 4=stone; 5=shell; 6=dentate tool; 7=cord wrapped stick tool; 8=sherd or flake; 9=smoothing; 10=brushing; 11=scraping; 12=striating; 13=combing.

Exterior Modifications: 0=no data; 1=trimming; 2=burnishing.

Lip Decoration\Tool Form: 0=no data; 1=fabric; 2=alternating notched tool (pseudo scallop shell); 3=parallel notched tool (dentate); 4=cord wrapped tool\S twist; 5=cord wrapped tool\Z twist; 6=pointed stylus; 7=blunt

stylus; 8=straight edge (unnotched); 9=finger/fingernail; 10=cord wrapped stick/twist undetermined.

Lip Decoration\Application: 0=no data; 1=simple stamp; 2=rocker stamp; 3=drawn; 4=circular punctation; 5="other" punctation shape; 6=notching.

Interior Rim Decoration\Tool Form: 0=no data; 1=fabric; 2=alternating notched tool (pseudo scallop shell); 3=parallel notched tool (dentate); 4=cord wrapped tool\S twist; 5=cord wrapped tool\Z twist; 6=pointed stylus; 7=blunt stylus; 8=straight edge (unnotched); 9=finger/fingernail; 10=cord wrapped stick/twist undetermined.

Interior Rim Decoration\Application: 0=no data; 1=simple stamp; 2=rocker stamp; 3=drawn; 4=circular punctation; 5="other" punctation shape; 6=notching.

Exterior Rim Decoration\Tool Form: 0=no data; 1=fabric; 2=alternating notched tool (pseudo scallop shell); 3=parallel notched tool (dentate); 4=cord wrapped tool\S twist; 5=cord wrapped tool\Z twist; 6=pointed stylus; 7=blunt stylus; 8=straight edge (unnotched); 9=finger/fingernail; 10=cord wrapped stick/twist undetermined.

Exterior Rim Decoration\Application: 0=no data; 1=simple stamp; 2=rocker stamp; 3=drawn; 4=circular punctation; 5="other" punctation shape; 6=notching.

Neck Decoration\Tool Form: 0=no data; 1=fabric; 2=alternating notched tool (pseudo scallop shell); 3=parallel notched tool (dentate); 4=cord wrapped tool\S twist; 5=cord wrapped tool\Z twist; 6=pointed stylus; 7=blunt stylus; 8=straight edge (unnotched); 9=finger/fingernail; 10=cord wrapped stick/twist undetermined.

Neck Decoration\Application: 0=no data; 1=simple stamp; 2=rocker stamp;

3=drawn; 4=circular punctation; 5="other" punctation shape; 6=notching.

Shoulder Decoration/Tool Form: 0=no data; 1=fabric; 2=alternating notched tool (pseudo scallop shell); 3=parallel notched tool (dentate); 4=cord wrapped tool\S twist; 5=cord wrapped tool\Z twist; 6=pointed stylus; 7=blunt stylus; 8=straight edge (unnotched); 9=finger/fingernail; 10=cord wrapped stick/twist undetermined.

Shoulder Decoration\Application: 0=no data; 1=simple stamp; 2=rocker stamp; 3=drawn; 4=circular punctation; 5="other" punctation shape; 6=notching.

Body Decoration\Tool Form: 0=no data; 1=fabric; 2=alternating notched tool (pseudo scallop shell); 3=parallel notched tool (dentate); 4=cord wrapped tool\S twist; 5=cord wrapped tool\Z twist; 6=pointed stylus; 7=blunt stylus; 8=straight edge (unnotched); 9=finger/fingernail; 10=cord wrapped stick/twist undetermined.

Body Decoration\Application: 0=no data; 1=simple stamp; 2=rocker stamp; 3=drawn; 4=circular punctation; 5="other" punctation shape; 6=notching.

Base Decoration\Tool Form: 0=no data; 1=fabric; 2=alternating notched tool (pseudo scallop shell); 3=parallel notched tool (dentate); 4=cord wrapped tool\S twist; 5=cord wrapped tool\Z twist; 6=pointed stylus; 7=blunt stylus; 8=straight edge (unnotched); 9=finger/fingernail; 10=cord wrapped stick/twist undetermined.

Base Decoration\Application: 0=no data; 1=simple stamp; 2=rocker stamp; 3=drawn; 4=circular punctation; 5="other" punctation shape; 6=notching.

Use-wear on Rim: 0=no data; 1=undamaged; 2=natural abrasion; 3=scratch marks; 4=cracking; 5=spalling; 6=chipping; 7=perforation (accidental or intentional); 8=cut marks; 9=pitting.

Use-wear on Body: 0=no data; 1=undamaged; 2=natural abrasion; 3=scratch marks; 4=cracking; 5=spalling; 6=chipping; 7=perforation (accidental or intentional); 8=cut marks; 9=pitting.

Use-wear on Base: 0=no data: 1=undamaged; 2=natural abrasion; 3=scratch marks; 4=cracking; 5=spalling; 6=chipping; 7=perforation (accidental or intentional); 8=cut marks; 9=pitting.

Residue on Rim Interior: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Rim Exterior: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Lip: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Neck: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Shoulder: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Body Interior: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Body Exterior: 0=no data or undtermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Base Interior: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue on Base Exterior: 0=no data or undetermined; 1=sooting; 2=charred organic deposit; 3=inorganic deposit.

Residue Analysis: 0=no data; 1=present; 2=absent; 3=sample collected.

Ceramic Period: n=1-7.

APPENDIX B

EXAMPLE OF RAW DATA ON VESSELS IN THE STUDY COLLECTION.

SITE #	VESSEL #	TEMPER: TYPE	SIZE	WALL CM	RIM FORM	BODY: DECORATION	APPLICATION
ALDK8	1	1	0	0	1/4	12	1
BKCQ10	1	3	0	5	1	0	0
BKCQ10	2	2	0	7	2	5	1
BKCQ10	3	2	0	5	0	5	1
BKCQ10	4	2	0	7	0	0	0
BKCQ10	5	1	2	9	0	12	1
BGDB2	1	3	0	10	0	12	2
BGDB2	2	1	3	7	0	3	2
BGDB4	1	1	2/3	0	0	12	1/3
BGDB4	2	1	2	7	2	3	1
BGDB4	3	2	0	0	0	12	1/3/4
BGDB4	4	3	0	10	0	0	0
BGDB4	5	3	0	7	0	12	1
BGDB4	6	3	0	6	0	12	1
BGDB4	1	1	2/3	9	0	3	1
BGDB4	2	1	3	13	0	3	1/2
BGDB4	3	1	2	11	2	3	1
BGDB4	4	1	2/3	9	1	0	0
BGDB4	5	1	2/3	0	0	3	2
BGDB4	6	1	0	10	2	12	1
BGDB4	7	1	2/3	7	0	3	1
BDGB4	8	3	0	9	1	12	1
BGDB4	9	1	2	10	2	12	1/4
BGDB4	10	3	0	9	0	12	2
BGDB4	11	1	2	11	2	12	1
BGDB4	12	2	0	11	0	12	1
BGDB3	1	1	2/3	9	2	0	0
BGDB5	1	1	2/3	7	2	3	2
BGDB5	2	1	2	9	2	0	0
BGDB5	3	1	1	0	0	0	0
BGDB5	4	1	2/3	12	2	0	0
BGDB5	5	1	1	9	2	0	0
BGDB5	6	1	1	10	2	0	0
BGDB5	7	1	1	7	2	3	2
BGDB5	8	1	2/3	11	2	0	0
BGDB5	9	1	2/3	8	2	0	0
BGDB5	10	1	2	0	0	0	0
BGDB5	11	1	2/3	0	2	0	0
BGDB5	12	1	2/3	0	0	0	0
BGDB5	13	1	2	0	0	0	0
BGDB5	14	1	2	0	2	0	0
BGDB5	15	1	2	7	2	0	0

BGDB5	16	1	2	7	1	0	0
BGDB5	17	1	2/3	9	2	0	0
BGDB5	18	1	1	10	3	0	0
BGDB5	19	1	2	8	2	0	0
BGDB5	20	1	2/3	13	2	0	0
BGDB5	21	1	1	6	3	0	0
BGDB5	22	1	2	8	2	0	0
BGDB5	23	1	3	10	2	0	0
BGDB5	24	1	2	9	2	0	0
BGDB5	25	1	3	14	0	01	1
BGDB5	26	1	1	7	0	2	1
BGDB7	1	3	0	8	0	12	1
BGDB7	2	2	0	9	0	12	1
BGDB7	3	3	0	6	0	12	1
BGDB7	4	1	3	9	0	3	2
BGDB7	5	3	0	7	0	0	0
BGDB7	6	2	0	7	0	12	1
BFDA1	1	1	3	11	0	12	1/2
BFDA1	2	1	3	0	2	0	0
BFDA1	3	1	3	10	0	0	0
BFDA1	4	1	1	0	1	0	0
BFDA1	5	1	2	7	0	12	1
BFDA1	6	1	1	8	1	3	1
BFDA1	7	1	2	9	0	3	2
BFDA1	8	1	2	7	1	3	1
BFDA1	9	1	1	6	0	2	1
BFDA1	10	1	1	4	0	3	1
BFDA1	11	1	3	5	2	0	0
BFDA1	12	1	2/3	8	0	3	1
BFDA1	13	1	2/3	0	1	0	0
BFDA1	14	1	2	7	0	2	1
BFDA1	15	1	2	6	2	3	1
BFDA1	16	1	2/3	0	2	0	0
BFDA1	17	1	1	0	0	0	0
BFDA1	18	1	2/3	6	1	3	1
BFDA1	19	1	3	16	1	3	1
BFDA1	20	1	1	6	0	2	1
BFDA1	21	1	3	7	0	01	1
BFDA1	22	1	3	5	0	3	1
BFDA1	23	1	2/3	0	2	0	0
BFDA1	24	1	1	5	0	12	1
BFDA1	25	1	2	11	0	3	1/2
BFDA1	26	1	2/3	6	0	2	1
BFDA1	27	1	1	6	0	3	1
BFDA1	28	1	2	8	0	3	2
BFDA1	29	3	0	10	0	12	2
BFDA1	30	1	1/2	7	2	3	1
BFDA1	31	1	3	7	0	01	0
BFDA1	32	1	1	0	0	3	1

BFDA1	33	1	1	7	1	2	1
JSL	1	1	2/3	9	1	0	0
JSL	2	1	3	11	2	3	1
JSL	3	1	3	13	2	0	0
JSL	4	1	2/3	7	2	0	0
JSL	5	1	1	6	1	0	0
JSL	6	1	3	10	2	0	0
JSL	7	1	2	10	1	0	0
JSL	8	1	2	10	2	0	0
JSL	9	1	3	8	2	0	0
EFG	1						
EFG	2	1	3	10	2	3	1
EFG	3	1	2	9	2	3	2
EFG	4	1	2	5	0	3	1
EFG	5	1	3	6	2	3	1
EFG	6	1	2	11	2	3	0
EFG	7	1	2	9	0	2	1
EFG	8	1	2	0	0	0	0
EFG	9	1	2/3	10	0	3	2
EFG	10	1	2	9	0	3	2
EFG	11	1	2/3	12	0	3	1
EFG	12	1	2	7	0	3	1
EFG	13	1	1/2	8	0	3	1
EFG	14	1	1/2	8	0	3	1
EFG	15	1	2	7	0	3	1
EFG	16	1	2	6	0	3	1
EFG	17	1	3	7	0	3	1
EFG	18	1	2	9	0	3	1
EFG	19	1	3	10	0	3	1
EFG	20	1	3	11	0	12	1
EFG	21	1	3	7	0	12	1
EFG	22	1	2	9	1	3	1
EFG	23	1	2	19	0	3	2
EFG	24	1	1	7	1	3	1
EFG	25	1	2	10	0	3	1
EFG	26	1	3	8	2	0	0
EFG	27	1	2	0	0	0	0
EFG	28	1	1	8	1	12	1
EFG	29	1	2	8	0	12/7	1/4
EFG	30	1/3	1/2	10	0	12	0
EFG	31	1	1	9	1	12	1
EFG	32	1	1	6	0	3	1
EFG	33	1	2	8	1	12	1
EFG	34	1	2	7	2	12	1
EFG	35	1	1	7	2	12	1
EFG	36	1	2	0	2	12	1
EFG	37	1	1/2	0	0	0	0
EFG	38	1	3	7	0	12	1
EFG	39	2	0	9	0	12/7	1/5
EFG	40	1	3	8	2	0	0

EFG	41	1	1/2	10	0	12	1/2
EFG	42	1	2	11	1	12	1/2
EFG	43	1	2	8	0	12	1
EFG	44	1	3	0	0	0	0
EFG	45	1	3	0	1	0	0
EFG	46	1	2	8	0	12	1
EFG	47	1	2	10	0	12	1
EFG	48	1	1	9	1	12	2
EFG	49	1	2	10	1	12	1
EFG	50	1	2	6	2	12	1
EFG	51	1	1	8	0	12	1
MEH	1	1	2	9	0	12	1
MEH	2	1	1	9	0	12	1
MEH	3	1	1	8	0	3	1
MEH	4	1	2	7	0	12	1
MEH	5	1	2	0	0	3	1
MEH	6	1	1	7	0	12	1
ALDL1	1	1	2/3	8	0	3	1
ALDL1	2	2	0	9	0	12	0
ALDL1	3	2	0	7	0	12	1
BHDC2	1	1	2	0	1	4	1
BHDC2	2	1	2	8	2	3	2
BBDH6	1	1	2	14	0	3	1
BBDH6	2	1	2	0	1	3	1
BBDH6	3	1	1	7	2	3	1
BBDH6	4	1	2	6	0	3	1
BBDH6	5	1	1	6	0	3	1
BBDH6	6	1	1	6	0	3	1
BBDH6	7	1	2	7	0	3	0
BBDH6	8	1	2	6	0	3	1
BBDH6	9	1	1	0	0	3	1
BBDH6	10	1	2/3	0	0	3	0
BBDH6	11	1	1	6	0	3	1
BBDH6	12	1	2	8	1	3	1
BBDH6	13	1	2	9	1	0	0
BBDH6	14	1	2	14	0	12	1
BBDH6	15	1	2	10	1	5	2
BBDH6	16	1	2	11	0	5	1
BBDH6	17	1	2	0	0	4	1
BBDH6	18	1	2/3	10	0	4	2
BBDH6	19	1	2	12	0	3	2
BBDH6	20	2	0	8	0	4	1
BBDH6	21	1	2/3	8	0	3	1
BBDH6	22	1	2/3	11	0	12	2
BBDH6	23	1	2	9	0	3	1
BBDH6	24	1	3	9	0	3	2
BBDH6	25	1	2/3	10	0	3	2
BBDH6	26	1	1	10	0	0	0
BBDH6	27	1	3	8	0	3	1
BBDH6	28	1	2/3	0	0	3	1

BBDH6	29	1	3	10	1	0	0
BBDH6	30	1	2	11	1	0	0
BBDH6	31	1	2/3	9	0	3	1
BBDH6	32	1	2	10	1	3	1/2
BBDH6	33	1	3	9	2	3	2
BBDH6	34	1	2	10	2	3	1
BBDH6	35	1	1/2	9	0	8	1
BBDH6	36	1	3	0	0	3	1
BBDH6	37	1	2/3	12	2	12	1
BBDH6	38	1	2	13	2	3	2
BBDH6	39	1	3	10	0	12	1
BBDH6	40	1	2	0	0	5	1
BBDH6	41	1	1/2	12	0	12	1
BBDH6	42	1	2/3	0	2	0	0
BBDH6	43	1	2/3	11	0	4	1
BBDH6	44	1	2/3	0	2	5	1
BBDH6	45	1	2	11	2	5	2
BBDH6	46	1	2	0	0	0	0
BBDH6	47	1	2/3	0	1	0	0
BBDH6	48	1	2	0	0	12	2
BBDH6	49	1	2/3	0	3	0	0
BBDH6	50	1	2/3	10	0	2	1
BBDH6	51	1	1	0	0	2/7	1/5
BBDH6	52	1	1/2	7	1	3	1
BBDH6	53	1	2	9	0	12	1
BBDH6	54	2	2	0	2	0	0
BBDH6	55	1	1	0	0	3	1
BBDH6	56	2	0	10	0	12	1
BBDH6	57	1	1	9	0	3	1
BBDH6	58	1	2	0	0	3	1
BBDH6	59	3	0	7	0	0	0
BBDH6	60	1/3	2	9	0	0	0
BBDH6	61	1/3	1	8	0	12	1
BBDH6	62	2	0	10	0	0	0
BBDH6	63	1	1	9	0	11	1
BBDH6	64	1	2	0	0	0	0
BBDH6	65	1	2/3	9	0	5	1
BBDH6	66	1	3	12	2	3	1/2
BBDH6	67	1	2	0	0	7	5
BBDH6	68	1	1/2	11	0	12	2
BBDH6	69	1	1	7	0	5	1
BBDH6	70	1	2/3	11	0	4	2
BBDH6	71	1	1/2	0	1	0	0
BBDH6	72	1	3	0	0	0	0
BBDH6	73	1	2	7	0	12	1
BBDH6	74	3	0	6	0	0	0
BBDH6	75	1	2/3	12	0	0	0
BBDH6	76	1	1	0	0	0	0
BBDH6	77	1	2/3	10	0	0	0
BBDH6	78	1	2	10	1	0	0

BBDH6	79	1	1	0	0	0	0
BBDH6	80	1	2	0	0	5	1
BBDH6	81	1	1	0	0	0	0
BBDH6	82	1	1	4	0	0	0
BBDH6	83	1	2	8	0	12	1
BBDH6	84	1	1	8	0	0	0
BBDH6	85	1	2/3	10	2	5	1/2
BBDH6	86	1	1	0	0	3	1
BBDH6	87	1	1/2	0	0	0	0
BBDH6	88	1	1/2	0	0	0	0
BBDH6	89	1	1/2	0	0	5	1
BBDH6	90	1	2/3	0	0	12	0
BBDH6	91	1	1/2	11	0	12	0
BBDH6	92	1	2/3	10	0	3	1
BDDK1	1	1	1/2	0	2	0	0
BDDK1	2	1	1/2	0	1	0	0
BDDK1	3	1	1/2	0	2	0	0
BDDK1	4	1	1/2	0	2	0	0
BDDK1	5	2	0	8	2	5	1
BDDK1	6	1	2	0	1	0	0
BDDK1	7	1	2/3	0	2	0	0
BDDK1	8	1	2/3	0	3	3	1
BDDK1	9	2	0	0	2	0	0
BDDK1	10	1/2	1/2	0	2	0	0
BDDK1	11	1	1	0	2	0	0
BDDK1	12	1	1/2	0	2	0	0
BDDK1	13	1	2/3	0	2	0	0
BDDK1	14	1	2/3	0	2	0	0
BDDK1	15	1	2/3	0	3	0	0
BDDK1	16	2	0	0	2	0	0
BDDK1	17	2	0	0	0	0	0
BDDK1	18	3	0	0	0	0	0
BDDK1	19	1	1	0	2	0	0
BDDK1	20	1	1/2	0	1	0	0
BDDK1	21	2	0	0	3	0	0
BDDK1	22	1	2/3	0	1	0	0
BDDK1	23	1/3	2	0	1	0	0
BDDK1	24	3	0	0	1	0	0
BDDK1	25	1	1/2	0	2	0	0
BDDK1	26	1	1	0	2	0	0
BDDK1	27	1	1/2	7	0	2	1
BDDK1	28	1	1	0	2	0	0
BDDK1	29	3	0	0	1	0	0
BDDK1	30	1	2	0	1	0	0
BDDK1	31	1	2/3	0	2	0	0
BDDK1	32	1	2/3	0	0	0	0
BDDK1	33	1	1/2	0	1	0	0
BDDK1	34	2	0	0	3	0	0
BDDK1	35	2	0	0	2	0	0
BDDK1	36	2	0	0	1	0	0

BDDK1	37	2	0	0	3	0	0
BDDK1	38	1	1/2	0	2	0	0
BDDK1	39	1	1/2	0	2	0	0
BDDK1	40	1	1/2	0	2	0	0
BDDK1	41	1	1	0	2	0	0
BDDK1	42	2	0	0	3	0	0
BDDK1	43	1	1/2	0	2	0	0
BDDK1	44	1	1/2	0	0	0	0
BDDK1	45	1	1/2	0	3	0	0
BDDK1	46	1	1/2	0	0	0	0
BDDK1	47	1	1/2	0	1	0	0
BDDK1	48	1	1/2	0	1	0	0
BDDK1	49	1	1/2	0	2	0	0
BDDK1	50	2	0	0	2	0	0
BDDK1	51	1	1/2	0	1	0	0
BDDK1	52	1	1/2	0	2	0	0
BDDK1	53	1	2/3	0	0	0	0
BDDK1	54	1	1/2	0	1	0	0
BDDK1	55	1	2/3	0	3	0	0
BDDK1	56	2	0	0	1	0	0
BDDK1	57	2	0	0	2	0	0
BDDK1	58	1	1	0	0	0	0
BDDK1	59	2	0	0	2	0	0
BDDK1	60	1	2/3	0	1	0	0
BDDK1	61	1	2/3	9	1	5	1
BDDK1	62	3	0	0	0	0	0
BDDK1	63	1	2/3	0	2	0	0
BDDK1	64	3	0	0	3	0	0
BDDK1	65	1	2/3	0	1	0	0
BDDK1	66	3	0	0	0	0	0
BDDK1	67	2	0	0	2	0	0
BDDK1	68	1	1/2	0	2	0	0
BDDK1	69	2	0	0	3	0	0
BDDK1	70	1	2/3	0	2	0	0
BDDK1	71	1	2/3	0	2	0	0
ALDF1	1	1	2/3	14	0	3	1/2
ALDF1	2	1	2/3	0	2	0	0
ALDF1	3	2	1/2	0	3	0	0
ALDF1	4	1	1/2	0	2	0	0
ALDF1	5	1	1/2	0	3	0	0
ALDF1	6	1	1	0	2	0	0
ALDF1	7	1	2/3	0	1	0	0
ALDF1	8	1	2/3	0	1	0	0
ALDF1	9	1	1/2	0	1	0	0
ALDF1	10	1	2/3	0	0	0	0
ALDF1	11	1	2/3	9	2	3	1
ALDF1	12	1	2/3	0	2	0	0
ALDF1	13	1	1/2	0	0	0	0
ALDF1	14	1	1/2	9	1	3	1

ALDF2	1	1	2	12	2	5	1
ALDF2	2	1	1/2	0	1	0	0
ALDF2	3	1	2/3	0	1	0	0
ALDF2	4	3	0	0	3	0	0
ALDF2	5	2	0	9	3	4	1
ALDF3	1	1	2/3	8	2	7	1/5
ALDF3	2	1	1	0	0	0	0
ALDF3ALDF1	3	1	2/3	9	2	0	0
ALDF3	4	1	2/3	0	1	0	0
ALDF3	5	1	2/3	0	2	0	0
ALDF3	6	1	2/3	9	2	0	0
ALDF3	7	1	2/3	0	1	0	0
ALDF3	8	2	0	0	2	0	0
ALDF3	9	1	2/3	0	2	0	0
ALDF3	10	1/3	1	0	2	0	0
ALDF3	11	1	2/3	0	2	0	0
ALDF3	12	1	2/3	9	2	0	0
ALDF3	13	1	2	12	0	6	3/5/5
ALDF3	14	1	2/3	0	0	0	0
ALDF3	15	1	2/3	10	0	3	2/5/3
ALDF3	16	1	2/3	10	0	3	1/2